



Principles of Macroeconomics

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0. Introduction

Principles of Economics

1. People face trade-offs
2. The cost of something is what you give up to get it
3. Rational people think at the margin
4. People respond to incentives
5. Trade can make everyone better off
6. Markets are usually a good way to organize economic activity
7. Governments can sometimes improve economic outcomes
8. A country's standard of living depends on its ability to produce goods and services
9. Prices rise when the government prints too much money
10. Society faces a short-run trade-off between inflation and unemployment

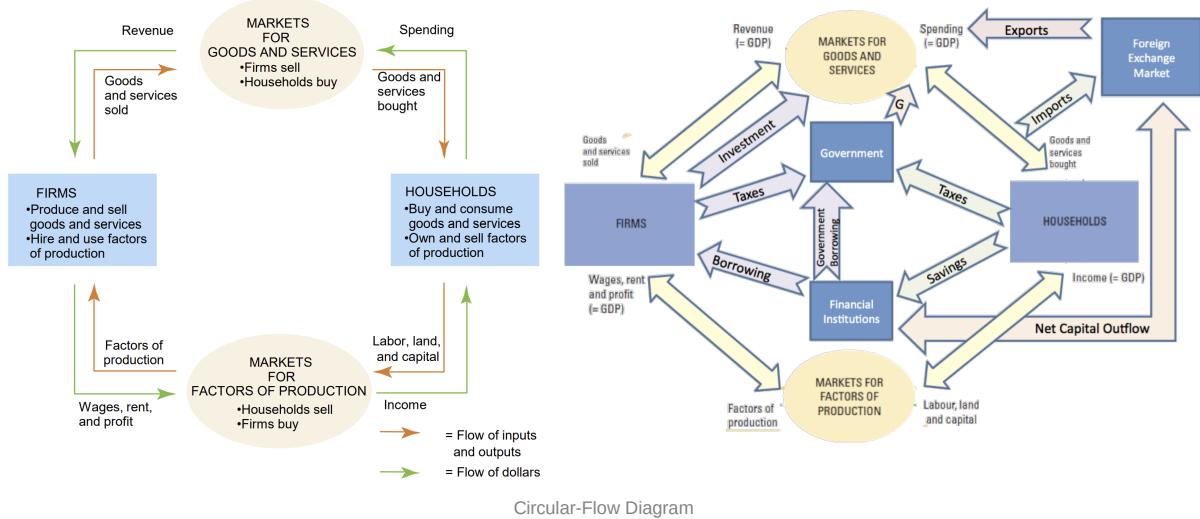
▼ 0.2 Summary of Chapter

- **The principles of personal decision making are:**
 - People face trade-offs.
 - The cost of something is what you give up to get it.
 - Rational people think at the margin.
 - People respond to incentives.
- **The principles of economic interaction are:**
 - Trade can make everyone better off.
 - Markets are usually a good way to organize economic activity.
 - Governments can sometimes improve market outcomes
(if there is some market failure or if the market outcome is inequitable).
- **The principles of the economy as a whole are:**
 - A country's standard of living depends on its ability to produce goods and services.
 - Prices rise when the government prints too much money.
 - Society faces a short-run trade-off between inflation and unemployment.
- **Economics is divided into two subfields:**
 - Microeconomics is the study of decision-making by households and firms in the marketplace.
 - Macroeconomics is the study of the forces and trends that affect the economy as a whole.
- A positive statement is an assertion about how the world is.
- A normative statement is an assertion about how the world ought to be.
- When economists make normative statements, they are acting more as policy advisors than scientists.
- Economists who advise policymakers offer conflicting advice either because of differences in scientific judgments or because of differences in values.
- At other times, economists are quite united in the advice they offer, but policymakers may choose to ignore it.

1. Economic Models

1.1 Circular-Flow Diagram

The circular-flow diagram is a visual model of the economy that shows how dollars flow through markets among households and firms.



⇒ Everything depends on Everything!

In the left graphic we see, that we can measure GDP in many different ways (and in theory every measurement is exactly the same).

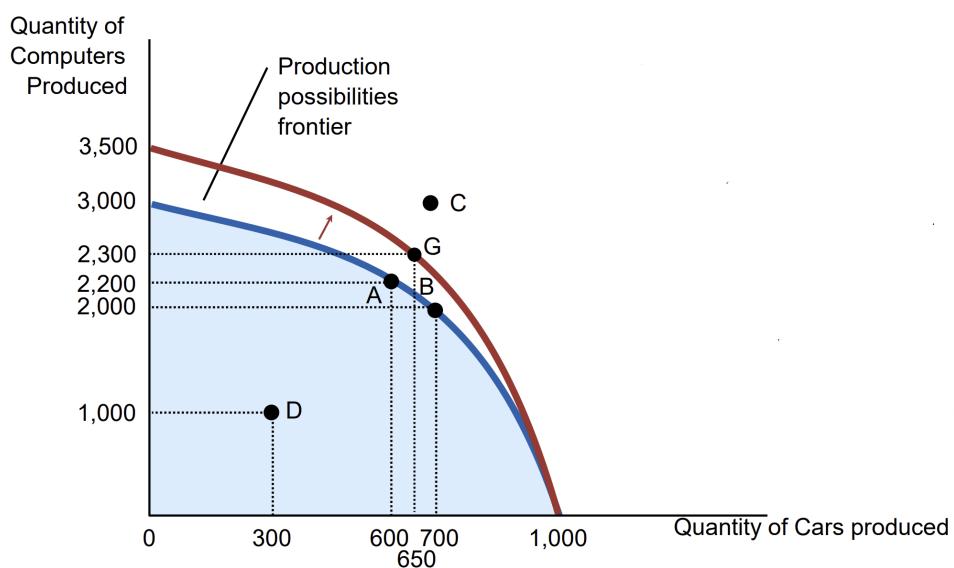
$$\text{GDP} = \text{Total Spending} = \text{Total Revenue} = \text{Total Wage, Rent \& Profit} = \text{Total Income}$$

Firms produce and sell goods and services whereas households buy and consume them. In contrast, households own and sell factors of production (land, labor and capital) whereas firms hire and use them.

1.2 Production Possibilities Frontier

The production possibilities frontier shows the combinations of output that the economy can possibly produce given the available factors of production and the available production technology.

Concepts illustrated by the production possibilities frontier: Efficiency, Trade-offs, Opportunity cost and Economic growth!



The Production Possibilities Frontier Model

When efficiency rises (in the economy as a whole or in one specific market), there is a shift in the production possibilities frontier. This results in an increase in productivity in one market which can also have an influence on

the output of another market.

2. National Accounting (GDP)

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Gross domestic product (GDP) is a measure of the income and expenditures of an economy. GDP equals the total amount spent by households in the market for goods and services.

GDP is the total market value of all final goods and services produced within a country in a given period of time.

▼ Explanation of Definition

“**GDP is the Market Value . . .**” Output is valued at market prices.

“**. . . Of All . . .**” Includes all items produced in the economy and legally sold in markets

What Is Not Counted in GDP? GDP excludes most items that are produced and consumed at home and that never enter the marketplace. It often excludes items produced and sold illicitly, such as illegal drugs.

“**. . . Final . . .**” It records only the value of final goods and services, not intermediate goods (the value is counted only once).

“**. . . Goods and Services . . .**” It includes both tangible goods (food, clothing, cars) and intangible services (haircuts, housecleaning, doctor visits).

“**. . . Produced . . .**” It includes goods and services currently produced, not transactions involving goods produced in the past.

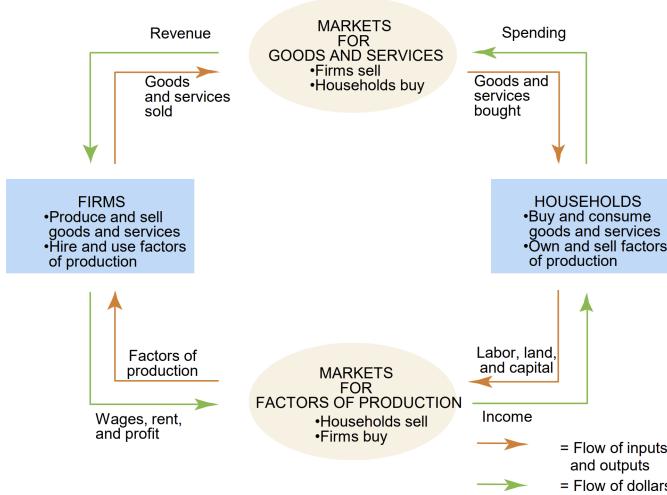
“**. . . Within a Country . . .**” It measures the value of production within the geographic confines of a country.

“**. . . In a Given Period of Time.**” It measures the value of production that takes place within a specific interval of time, usually a year or a quarter (three months).

GDP per person tells us the income and expenditure of the average person in the economy. Higher GDP per person indicates a higher standard of living (only an approximation!).

2.1 How to measure GDP?

There are multiple ways to calculate GDP: Because for the total economy income equals expenditure, we can calculate GDP by adding up total expenditure in the economy, or by adding up total income in the economy.



- From the demand side
 - (Private & Public) Consumption, Investment, Net Exports
- From the production side
 - Labour, Productivity (per sector)
- From the income side
 - Labour- and Capital income

2.2 Demand-side components of GDP

- **Consumption (C):** spending by households on goods and services, with the exception of purchases of new housing
- **Investment (I):** spending on capital equipment, inventories and structures, including household purchases of new housing

- **Government spending (G):** spending on goods and services by local and national government (Does not include transfer payments!)
- **Net Exports (NX = X-M):** spending on domestically produced goods and services by foreigners (exports) minus spending on foreign goods by domestic residents (imports)

$$GDP = \underbrace{Y}_{\text{National income}} = \underbrace{C + I + G + NX}_{\text{National expenditure}}$$

In Theory, measuring GDP through income or expenditure will arrive the same result. National income (Y), national expenditure and GDP are invariably used synonymously.

▼ Components of GDP in Switzerland

	Total (in Mln. CHF)	Per person (in CHF)	Percent of total
2021			
GDP, Y	731,662	84,055	100%
Consumption, C	365,286	41,965	50%
Investment, I	190,597	21,896	26%
Government consumption, G	88,771	10,198	12%
Net exports, NX = X-M	87,008	9,996	12%
Exports, X	522,196	59,991	71%
Imports, M	435,189	49,996	59%

GDP and Its Components (Total and per Person) in Switzerland

2.3 Real and Nominal GDP

Nominal GDP reflects both the prices of goods and services and the quantities of goods and services the economy is producing. In contrast, by holding prices constant at base year levels, real GDP reflects only in quantities produced.

real GDP: the production of goods and services valued at constant prices

GDP calculated using prices that existed a particular base year, which takes into account changes in inflation

nominal GDP: the production of goods and services valued at current prices

GDP calculated by multiplying the output of goods and services by the prices of those goods and services in the reporting year

⇒ **Real GDP is a more accurate measure of economic well-being than nominal GDP**, because changes in real GDP are not affected by changes in prices, but reflect only changes in production.

▼ Example: Calculating real/nominal GDP and GDP deflator

Prices and Quantities				
Year	Price of Hot dogs	Quantity of Hot dogs	Price of Hamburgers	Quantity of Hamburgers
2005	\$1	100	\$2	50
2006	\$2	150	\$3	100
2007	\$3	200	\$4	150

Calculating Nominal GDP

2005	$(\$1 \text{ per hot dog} \times 100 \text{ hot dogs}) + (\$2 \text{ per hamburger} \times 50 \text{ hamburgers}) = \200
2006	$(\$2 \text{ per hot dog} \times 150 \text{ hot dogs}) + (\$3 \text{ per hamburger} \times 100 \text{ hamburgers}) = \600
2007	$(\$3 \text{ per hot dog} \times 200 \text{ hot dogs}) + (\$4 \text{ per hamburger} \times 150 \text{ hamburgers}) = \$1,200$

Calculating Real GDP (base year 2005)

2005	$(\$1 \text{ per hot dog} \times 100 \text{ hot dogs}) + (\$2 \text{ per hamburger} \times 50 \text{ hamburgers}) = \200
2006	$(\$1 \text{ per hot dog} \times 150 \text{ hot dogs}) + (\$2 \text{ per hamburger} \times 100 \text{ hamburgers}) = \350
2007	$(\$1 \text{ per hot dog} \times 200 \text{ hot dogs}) + (\$2 \text{ per hamburger} \times 150 \text{ hamburgers}) = \500

Calculating the GDP Deflator

2005	$(\$200/\$200) \times 100 = 100$
2006	$(\$600/\$350) \times 100 = 171$
2007	$(\$1,200/\$500) \times 100 = 240$

GDP deflator: a measure of the price level calculated as the ratio of nominal GDP to real GDP times 100

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

2.4 Chain Linking

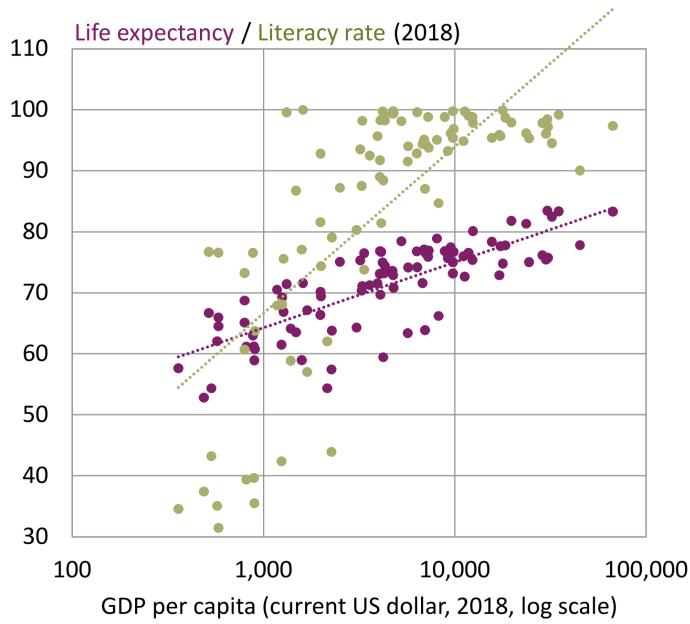
In most western countries the statistical offices produce a single measure of GDP and they do this by using income, expenditure and output. In theory these measures should produce the same result. However, there are various difficulties in measuring GDP. Such as under-reporting in order to avoid tax, and the problem of changes in the goods and services produced over time that render the use of base years problematic.

Annual chain linking can be used to tackle this latter problem. Rather than updating the base year every five or ten years, this method does it every year, calculating the prices in previous years' prices.

2.5 Is GDP a good measure of economic well-being?

GDP is the best single measure of economic well-being of a society. GDP per person tells us the income and expenditure of the average person in the economy. So higher GDP per person indicates a higher standard of living. GDP is not a perfect measure of the happiness or quality of life, however. (But there is a high correlation between GDP per Person and Life expectancy / Literacy rate!)

- ▼ Correlation between GDP per Person and Life expectancy / Literacy rate



Some things that contribute to well-being are not included in GDP.

- The value of leisure.
- The value of a clean environment.
- The distribution of income.
- The value of almost all activity that takes place outside of markets, such as the value of the time parents spend with their children and the value of volunteer work.

2.6 Measuring the cost of Living: The consumer price Index (CPI) and Inflation rate

Consumer Price Index (CPI): a measure of the overall prices of the goods and services bought by a typical costumer

It is used to monitor changes in the cost of living over time. When the CPI rises, the typical consumer has to spend more money to maintain the same standard of living.

2.6.1 How the consumer Price index is calculated

1. Fix the basket: Determine what prices are most important to the typical consumer
2. Find the prices: Find the prices of each of the goods and services in the basket for each point in time.
3. Compute the basket's cost: Use the data on prices to calculate the cost of the basket of goods and services at different times.
4. Choose a base year and compute the index: $\text{CPI in year } t = \frac{\text{Price of basket in year } t}{\text{Price of basket in base year}} \cdot 100$
5. Compute the consumer price inflation rate

Inflation rate: the percentage change in the price index from the preceding period

$$\text{Inflation rate}_{\text{year } t} = \frac{(\text{Price index}_{\text{year } t}) - (\text{Price index}_{\text{year } t-1})}{(\text{Price index}_{\text{year } t-1})} \cdot 100$$

▼ Calculating Consumer Price Index and the Inflation Rate: An Example

Step 1: Survey Consumers to Determine a Fixed Basket of Goods

Basket = 4 hot dogs, 2 hamburgers

Step 2: Find the Price of Each Good in Each Year

Year	Price of Hot Dogs	Price of Hamburgers
2005	\$1	\$2
2006	2	3
2007	3	4

Step 3: Compute the Cost of the Basket of Goods in Each Year

- 2005 $(\$1 \text{ per hot dog} \times 4 \text{ hot dogs}) + (\$2 \text{ per hamburger} \times 2 \text{ hamburgers}) = \8 per basket
- 2006 $(\$2 \text{ per hot dog} \times 4 \text{ hot dogs}) + (\$3 \text{ per hamburger} \times 2 \text{ hamburgers}) = \14 per basket
- 2007 $(\$3 \text{ per hot dog} \times 4 \text{ hot dogs}) + (\$4 \text{ per hamburger} \times 2 \text{ hamburgers}) = \20 per basket

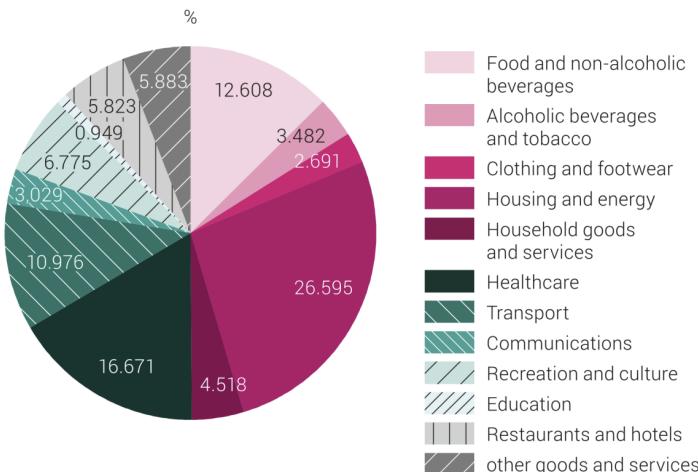
Step 4: Choose One Year as a Base Year (2005) and Compute the Consumer Price Index in Each Year

2005	$(\$8/\$8) \times 100 = 100$
2006	$(\$14/\$8) \times 100 = 175$
2007	$(\$20/\$8) \times 100 = 250$

Step 5: Use the Consumer Price Index to Compute the Inflation Rate from Previous Year

2006	$(175 - 100)/100 \times 100 = 75\%$
2007	$(250 - 175)/175 \times 100 = 43\%$

▼ CPI basket and weights in Switzerland 2022



Historical developments in RPI (=CPI) weights for the United States

RPI GROUP	1987	2012
Food	167	114
Catering	46	47
Alcohol	76	56
Tobacco	38	29
Housing	157	237
Fuel and light	61	46
Household goods	73	62
Household services	44	67
Clothing and footwear	74	45
Personal goods and services	38	39
Motoring expenditure	127	131
Fares and other travel costs	22	23
Leisure goods	47	33
Leisure services	30	71

2.6.2 Problems in Measuring the Cost of Living

The CPI is an accurate measure of the selected goods that make up the typical bundle, but it is not a perfect measure of the cost of living.

There are three key issues that cause the CPI to overstate the true cost of living:

1. **Substitution bias:** The basket does not change to reflect consumer reaction to changes in relative prices (consumers substitute toward goods that have become relatively less expensive).
2. **Introduction of new goods:** The basket does not reflect the change in purchasing power brought on by the introduction of new products (new products result in greater variety, which in turn makes each dollar more valuable).
3. **Unmeasured quality changes:** The statistical office tries to adjust the price for constant quality, but such differences are hard to measure.

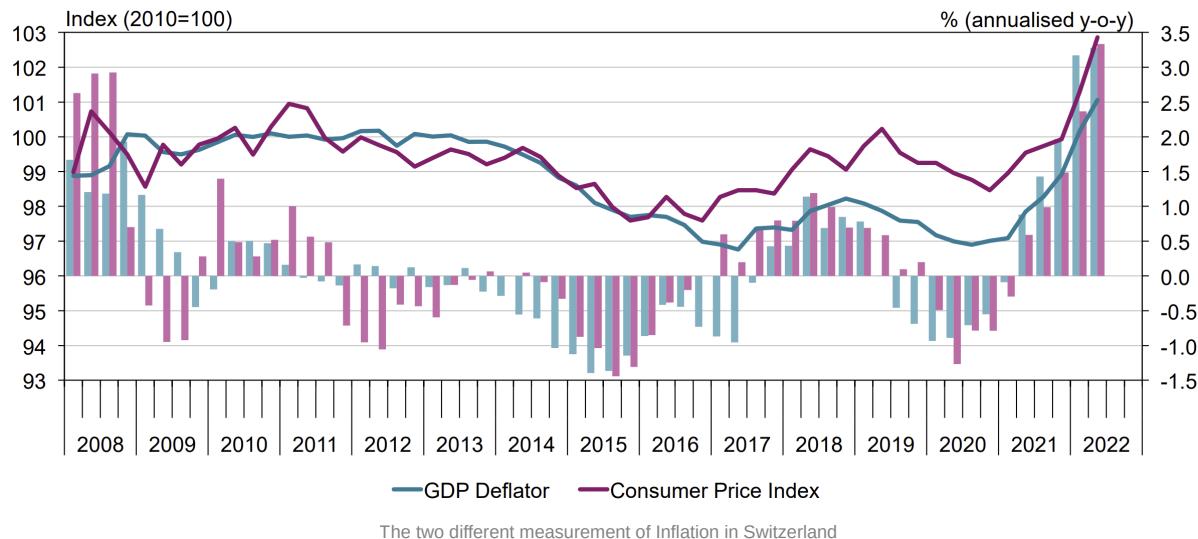
The statistical office calculates other prices indexes: The [producer price index](#), which measures the cost of a basket of goods and services bought by firms rather than consumers. Because firms eventually pass on higher costs to consumers in the form of higher prices on products, the producer price index is believed to be helpful in predicting changes in the CPI.

2.6.3 The GDP Deflator versus the Consumer Price Index

Economists and policymakers monitor both the GDP deflator and the consumer price index to gauge how quickly prices are rising.

There are two important differences between the indexes that can cause them to diverge.

1. The [GDP deflator](#) reflects the prices of all goods and services produced domestically, whereas...
...the [consumer price index](#) reflects the prices of all goods and services bought by consumers.
2. The [consumer price index](#) compares the price of a fixed basket of goods and services to the price of the basket in the base year (only every five years does the SFSO change the basket)...
...whereas the [GDP deflator](#) compares the price of currently produced goods and services to the price of the same goods and services in the base year.



2.7 Correcting economic variables for the effects of inflation

Price indexes are used to correct for the effects of inflation when comparing money figures from different times.

▼ 2.8 Summary of the Chapter

- Because every transaction has a buyer and a seller, the total expenditure in the economy must equal the total income in the economy.
- Gross domestic product (GDP) measures an economy's total expenditure on newly produced goods and services and the total income earned from the production of these goods and services.
- GDP is the market value of all final goods and services produced within a country in a given period of time.

- GDP is divided among four components of expenditure: consumption, investment, government purchases, and net exports.
- Nominal GDP uses current prices to value the economy's production. Real GDP uses constant baseyear prices to value the economy's production of goods and services.
- The GDP deflator—calculated from the ratio of nominal to real GDP—measures the level of prices in the economy
- GDP is a good measure of economic well-being because people prefer higher to lower incomes.
- It is not a perfect measure of well-being because some things, such as leisure time and a clean environment, are not measured by GDP.
- The consumer price index (CPI) shows the cost of a basket of goods and services in one year relative to the cost of the same basket in the base year.
- The index is used to measure the overall level of prices in the economy.
- The percentage change in the CPI measures the inflation rate.
- The consumer price index is an imperfect measure of the cost of living for the following three reasons: substitution bias / the introduction of new goods / and unmeasured changes in quality.
- The GDP deflator differs from the CPI because it includes goods and services produced rather than goods and services consumed.
- In addition, the CPI uses a fixed basket of goods, while the GDP deflator automatically changes the group of goods and services over time as the composition of GDP changes.
- Money figures from different points in time do not represent a valid comparison of purchasing power.
- Various laws and private contracts use price indexes to correct for the effects of inflation.
- The real interest rate equals the nominal interest rate minus the rate of inflation.

3. Production and Growth

Chapter 21

A country's standard of living depends on its ability to produce goods and services.

▼ Annual growth rates that seem small become significant when compounded for many years

Annual growth rate of income per capita	Percentage increase in living standards after		
	...25 years	...50 years	...100 years
0.5%	13.3%	28.3%	64.7%
1.0%	28.2%	64.5%	170.5%
1.5%	45.1%	110.5%	343.2%
2.0%	64.1%	169.2%	624.5%
2.5%	85.4%	243.7%	1081.4%

Huge effects from small differences

3.1 Definitions

Productivity refers to the amount of goods and services produced for each hour of a worker's time

A nation's standard of living is determined by the productivity of its workers

GDP per capita takes the level of real GDP at a point in time and divides it by the population to get a measure of income per head

$$\text{Real GDP per capita} = \frac{\text{Real GDP}}{\text{Total Population}}$$

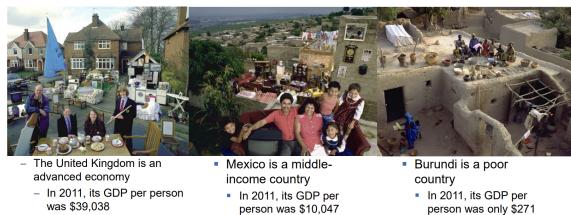
GDP per worker is a measure of the income per head of the working population

$$\text{Real GDP per worker} = \frac{\text{Real GDP}}{\text{Number of People in Employment}}$$

Living standards, as measured by real GDP per capita, vary significantly among nations!

▼ Living standards around the world

- The United Kingdom is an advanced economy. In 2019, its GDP per capita was \$42,230
- Poland is a middle-income country. In 2019, its GDP per capita was \$15,630
- The Central African Republic is a poor country. In 2019, its GDP per capita was only \$441



3.2 Growth Theory

Trend rate of growth: The average sustainable rate of economic growth over a period of time

The **Solow theory** has been used to explain economic growth. It identifies the rate of human and physical capital and population growth as being key determinants.

Productivity plays a key role in determining living standards for all nations in the world.

Other factors that (may) influence productivity, and thereby economic growth:

- How open to trade a country is
- How easy it is to do business and how and the extent to which corruption is minimised
- The extent to which violence, war and conflict exist in a country
- Regional, institutional and cultural characteristics
- Geographical factors such as physical resource endowments and climate

Why Productivity is so important: A nation can enjoy a high standard of living if it can produce a large quantity of goods and services. Hence, to understand the large differences in living standards we observe across countries or over time, we focus on the production of goods and services.

3.3 How Productivity is determined

The inputs used to produce goods and services are called the factors of production (listed below). The factors of production directly determine productivity.

Physical capital per worker is the stock of equipment and structures that are used to produce goods and services

It includes machines and tools build or repair automobiles or furniture / Office buildings, schools, etc.

Physical capital is a produced factor of production. It is an input into the production process that in the past was an output from

that process.

Human capital per worker is the economist's term for the knowledge and skills that workers acquire through education, training, and experience

Like physical capital, human capital raises a nation's ability to produce goods and services.

Natural resources are inputs used in production that are provided by nature

For example: Renewable resources include trees and forests, Nonrenewable resources include petroleum and coal.
Natural resources can be important but are not necessary for an economy to be highly productive.

Technological knowledge includes society's understanding of the best ways to produce

Human capital includes the resources expended transmitting this understanding to the labour force.

3.4 The Production Function

Economists often use a production function to describe the relationship between the quantity of inputs used in production and the quantity of output from production.

$$Y = A \cdot F(L, K, H, N)$$

Y = quantity of output

A = available production technology

L = quantity of labour

K = quantity of physical capital

H = quantity of human capital

N = quantity of natural resources

$F()$ is a function that shows how the inputs are combined

A production function has constant returns to scale if, for any positive number x

$$x \cdot Y = A \cdot F(x \cdot L, x \cdot K, x \cdot H, x \cdot N) \quad , x \in \mathbb{R}^+$$

A doubling of all inputs causes the amount of output to double as well!

3.5 Solow Model of Growth (Determinants of Growth)

GDP in any country can be assumed to be an extension of a firm's production function where the level of output is dependent on the factors of production employed. We have the following assumptions:

- Two production factors: labour (L) and capital (K) (next to technology: A)
- $Output(GDP) = Y = AF(K, L)$
- Constant returns to scale: $xY = AF(xK, xL)$
- This implies that capital and labour are each subject to **diminishing marginal returns**
- A closed economy and no government ($G=0$ & $NX=0$)
- Therefore, $Y = C + I + G + NX$ simplifies to $Y = C + I$

For the economy as a whole, saving must be equal to investment ($Y - C \equiv S = I$). We assume that a constant share of income is saved and therefore invested, $S = s \cdot Y$. Firms invest in order to raise future productivity or to replace depreciated capital, we assume capital depreciates with a constant rate, $D = \delta \cdot K$ (we assume that $\delta \approx 5\%$). The difference between total investment (I) and depreciation (D) is called net investment.

3.5.1 The aggregate Production Function and Investment

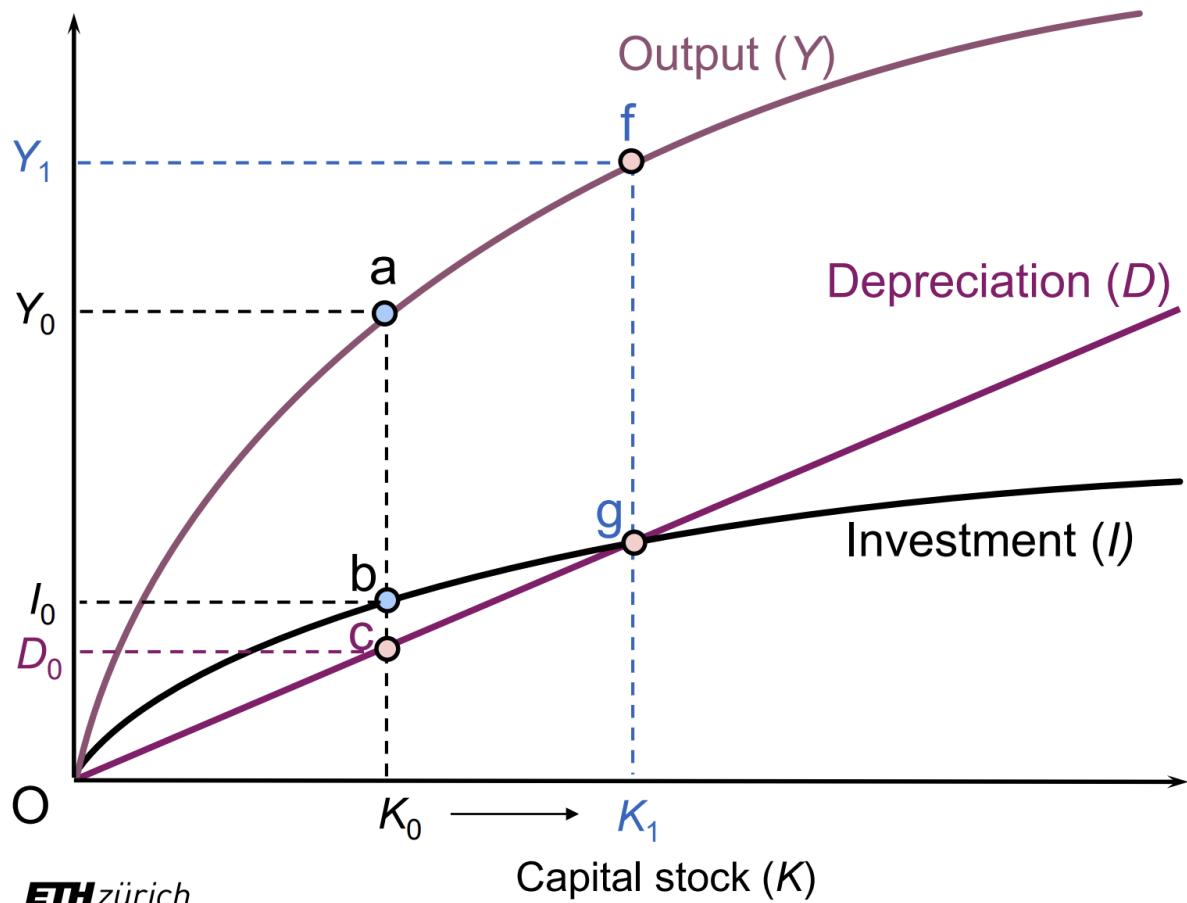
Recall that the output level denoted by letter Y (the GDP), is determined by the level of technology (A), and the quantities and productivity of labour and capital (K and L).

GDP is on the vertical axis and the physical capital stock is on the horizontal axis. Assuming technology is given, an increasing physical capital stock is associated with a rising GDP. GDP rises relatively quickly at first but then slows due to the law of diminishing marginal product.

The investment (I) is dependant on the savings ratio in the country, and a higher saving rate will be associated with an increase in capital accumulation.

Some investment is spent on replacing worn out and obsolete capital, termed depreciation. The depreciation rate is assumed to be relatively constant as a proportion of the amount of physical capital.

The distance between GDP and the investment level is consumption!

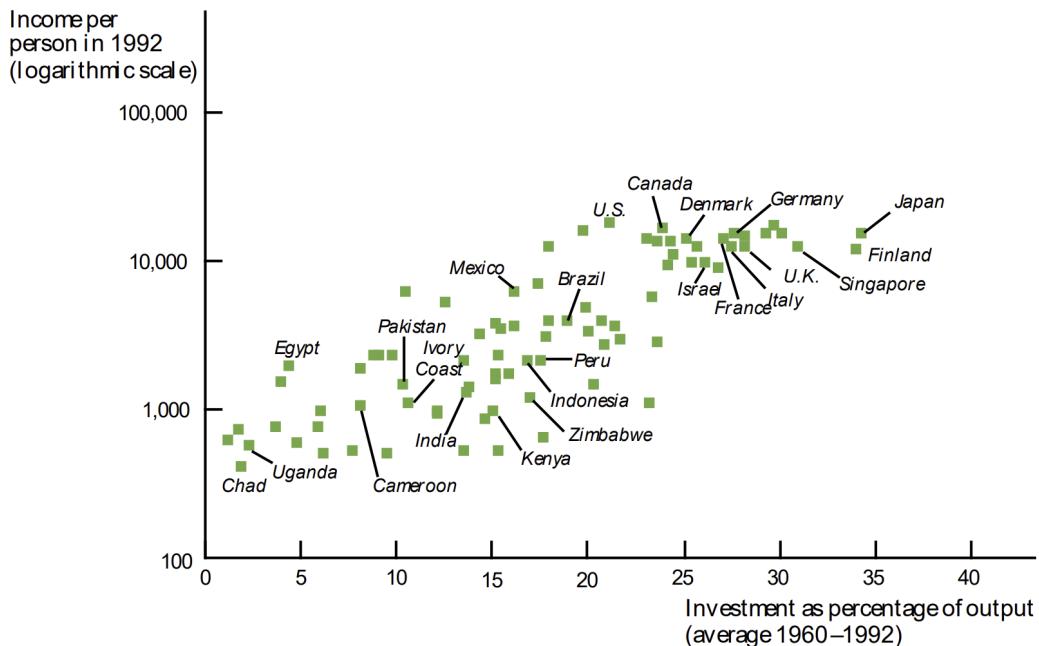


At K_0 , investment per worker is higher than depreciation per worker and so the capital-output ratio, or capital per worker, raises. As capital per worker rises, output per worker increases from the initial value. The economy will continue to grow until it reaches a capital-output ratio of K_1 . At this ratio, investment spending is equal to the depreciation rate and the capital-output ratio will remain constant. This is the so called **steady-state equilibrium**.

Increasing the saving rate, allows K and Y to grow further, again until $D = I$.

Steady-state equilibrium: the point in a growing economy where investment spending is the same as spending on depreciation and the capital-output ratio remains constant

▼ International Evidence on Investment Rates and Income per Person

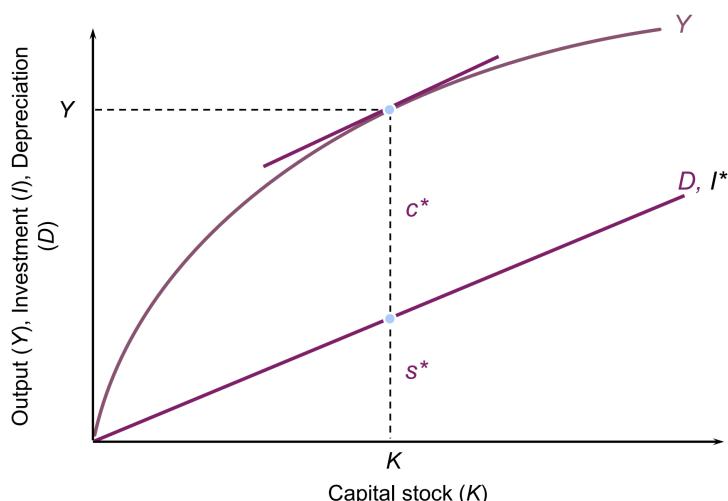


3.5.2 Causes of Growth

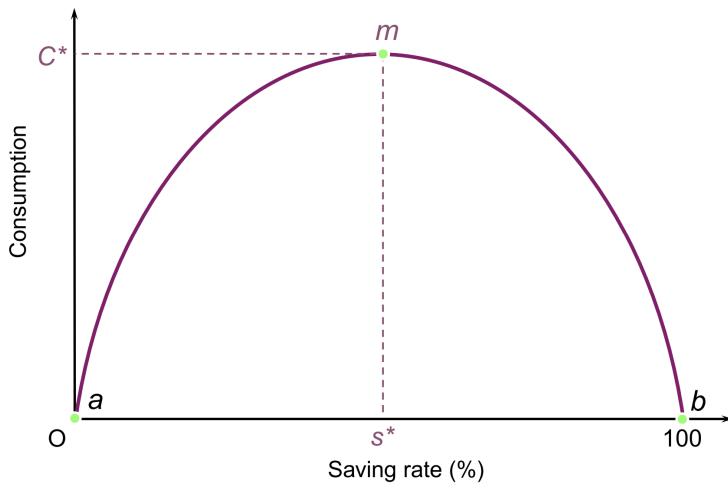
Increase of saving rate \Rightarrow Investment is now higher than spending on depreciation \Rightarrow increase in capital-output ratio moving the economy to a new steady-state equilibrium

An increase in the saving rate leads to a higher growth only for a while. As the higher saving rate allows more capital to be accumulated, the benefits from additional capital becomes smaller over time, and so growth slows down. In the long run, the higher saving rate leads to a higher level of productivity and income, but not to higher growth in these variables.

There's a unique saving rate that maximizes the difference between output and investment!

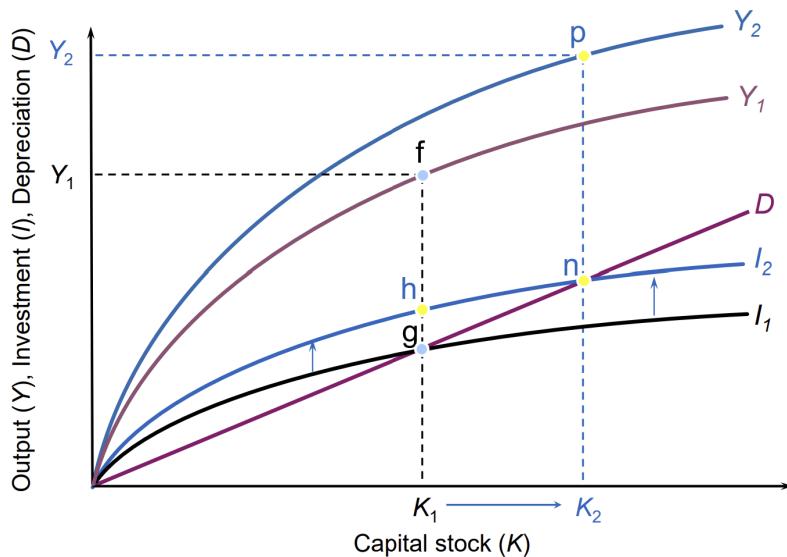


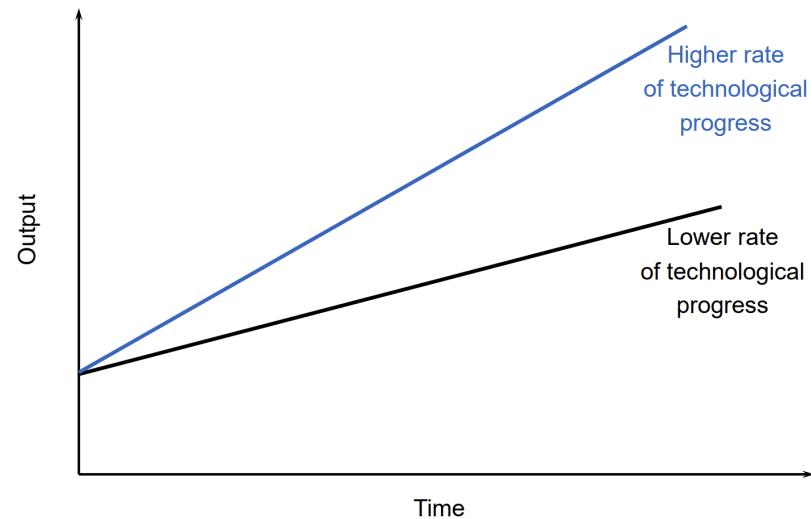
Steady state consumption



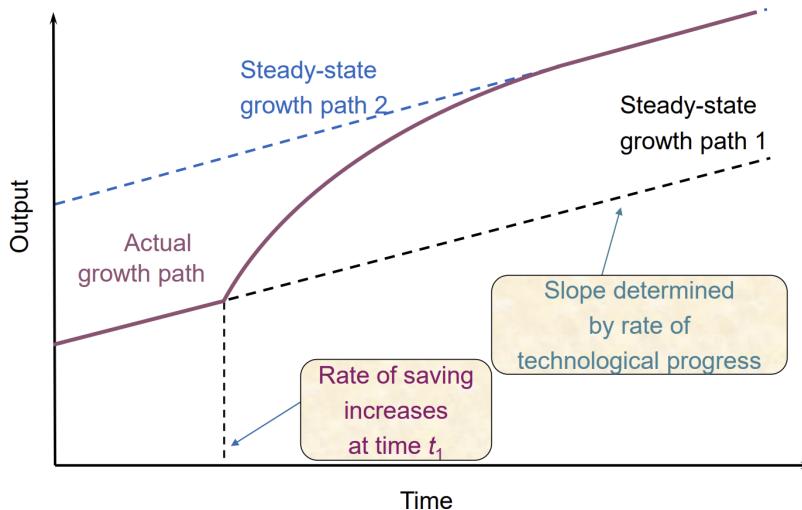
Increase in Technology \Rightarrow Increase in income because both capital and labour become more productive

If we allow for technological progress, the growth rate in the steady state doesn't have to be zero:





If we combine technological progress and an increase in the saving rate, we get:



Effect of an increase in the saving rate with given technological progress

3.5.3 Summary of Solow Growth

Key to growth is the accumulation of capital stock. A higher capital stock will help generate higher output. Capital accumulation is made possible by investment from saving. If the savings rate leads to investment that is higher than spending on depreciation, the economy will move towards its steady-state equilibrium. Increases in the saving rate in itself, does not generate increases in output per capita because of the diminishing marginal product of labour and capital. Improvement in technology can offset the effects of diminishing marginal product and generate both increased output and output per capita.

3.6 Economic Growth and public policy

Government policies that raise productivity and living standards:

- Encourage saving and investment
- Encourage investment from abroad
- Encourage education and training
- Establish secure property rights and maintain political stability
- Promote free trade
- Promote research and development

One way to raise future productivity is to invest more current resources in the production of capital. Since resources are scarce, producing more capital requires producing fewer consumption goods.

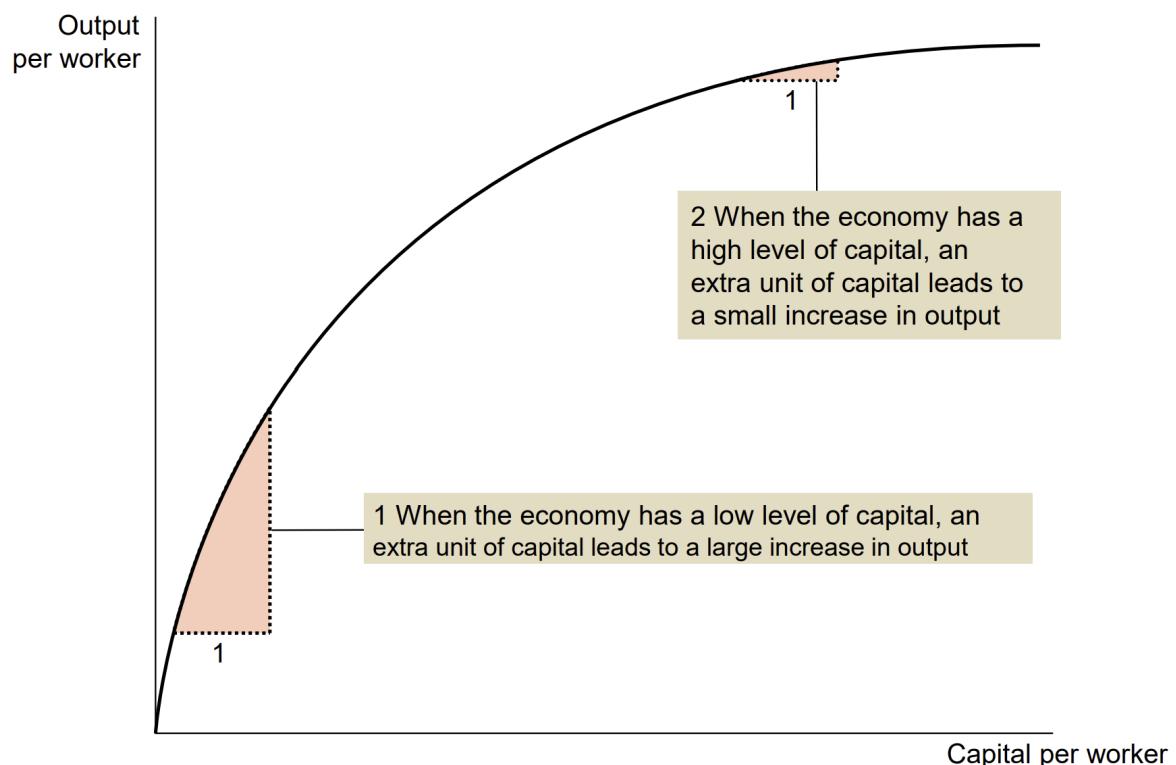
Reducing consumption = increasing saving

This extra saving funds the production of investment goods. Hence, a [trade-off between current and future consumption](#).

3.6.1 Diminishing returns and the catch-up effect

As the stock of capital rises, the extra output produced from an additional unit of capital falls; this property is called [diminishing returns](#). Because of diminishing returns, an increase in the saving rate leads to higher growth only for a while.

catch-up effect: the property whereby countries that start off poor tend to grow more rapidly than countries that start off rich



Illustrating the Production Function and an example of the Catch-Up Effect

3.6.2 Investment from Abroad

Governments can increase capital accumulation and long-term economic growth by encouraging investment from foreign sources. Investment from abroad takes several forms:

- Foreign Direct Investment
- Capital investment owned and operated by a foreign entity
- Foreign Portfolio Investment
- Investments financed with foreign money but operated by domestic residents

Some of the returns from these investments flow back to the foreign countries that supplied the funds. Especially beneficial in poor countries that cannot generate enough saving to fund investment projects themselves. It also helps poor countries learn state-of-the-art technologies developed in other countries.

3.6.3 Education

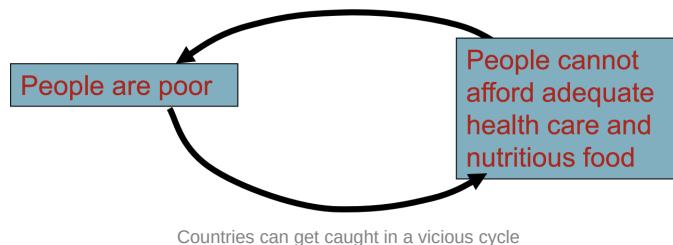
For long-run growth, education is at least as important as investment in physical capital. Investing in human capital also involves a trade-off between the present and the future: Spending a year in school requires sacrificing a year's wages now to have higher wages later.

Government can enhance the standard of living by providing schools and encourage the population to take advantage of them. Positive externality: An educated person might generate new ideas about how best to produce goods and services, which in

turn, might enter society's pool of knowledge and provide an external benefit to others. One problem facing some poor countries is the **brain drain** – the emigration of many of the most highly educated workers to rich countries.

3.6.4 Health and Nutrition

Healthier workers are more productive. Health care expenditure is a type of investment in human capital. Investments in the health of the population can lead to increase living standards.



3.6.5 Property Rights and Political Stability

Property rights refer to the ability to exercise authority over resources one owns. An economy-wide respect for property rights is an important prerequisite for the price system to work. In many poor countries, the justice system doesn't work very well:

- Contracts aren't always enforced
- Fraud, corruption often go unpunished
- In some, firms must bribe government officials for permits

It is necessary for investors to feel that their investments are secure. Political instability (e.g., frequent coups) creates uncertainty over whether property rights will be protected in the future.

3.6.6 Free Trade

Trade is, in some ways, a type of technology. A country that eliminates trade restrictions will experience the same kind of economic growth that would occur after a major technological advance. Some countries engage in ...

- ... inward-orientated trade policies, avoiding interaction with other countries
- ... outward-orientated trade policies, encouraging interaction with other countries

Countries with inward-oriented policies have generally failed to create growth. Countries with outward-oriented policies have often succeeded.

3.6.7 Technological progress - Research and Development

The advance of technological knowledge has led to higher standards of living. One reason is that knowledge is a public good: Ideas can be shared freely, increasing the productivity of many.

Technology can offset the effects of diminishing marginal product. Most technological advances come from private research by firms & individuals. Innovation and R&D are important ways in which technology growth can arise and can provide competitive advantage for firms over rivals which are both distinctive and defensible. Government can encourage the development of new technologies through:

- Patent laws
- Tax incentives or direct support for private sector R&D
- Grants for basic research at universities

3.6.8 Population Growth

The most direct effect is on the size of the labour force: a large population means more workers to produce goods and services. At the same time, it means more people to consume those goods and services.

3.7 Endogenous Growth Theory

Endogenous growth theory is a theory of long-run economic growth which results from the creation of new knowledge and technology which impacts on everyone and makes them more productive as a result

▼ 3.8 Summary of the Chapter

- Economic prosperity, as measured by real GDP per person, varies substantially around the world
- The average income of the world's richest countries is more than ten times that in the world's poorest countries
- The standard of living in an economy depends on the economy's ability to produce goods and services
- Productivity depends on the amounts of physical capital, human capital, natural resources, and technological knowledge available to workers
- Government policies can influence the economy's growth rate in many different ways
- The Solow model notes that the accumulation of capital is subject to diminishing returns
- Economic prosperity, as measured by real GDP per person, varies substantially around the world
- Productivity depends on the amounts of physical capital, human capital, natural resources, and technological knowledge available to workers
- Government policies can influence the economy's growth rate in many different ways
- The Solow model notes that the accumulation of capital is subject to diminishing returns
- Because of diminishing returns, higher saving leads to a higher growth for a period of time, but growth will eventually slow down
- Also because of diminishing returns, the return to capital is especially high in poor countries
- Endogenous growth theory explains how technology can change and offset the effects of diminishing marginal productivity. Innovation and R&D are important ways in which technology growth can arise
- Government policies can try to influence the economy's growth rate in many ways: by encouraging saving and investment, encouraging investment from abroad, fostering education, maintaining property rights and political stability, allowing free trade, promoting the research and development of new technologies, and controlling population growth

4. Unemployment

Chapter 21 and Chapter 23

Unemployment incurs costs to the individual (loss of earnings, stress, self-esteem and health problems, family breakdown, de-skilling etc.) as well as costs to the society and economy (opportunity costs, tax and benefits effects, etc.).

Employed: a person with a job

Unemployed: A person is considered as unemployed, if that person does not have a job and(!) is able and available (willing) to work at current wage rates.

4.1 Categories of Unemployment

Natural Rate of Unemployment: the normal rate of unemployment around which the unemployment rate fluctuates. It is the amount of unemployment that the economy normally experiences.

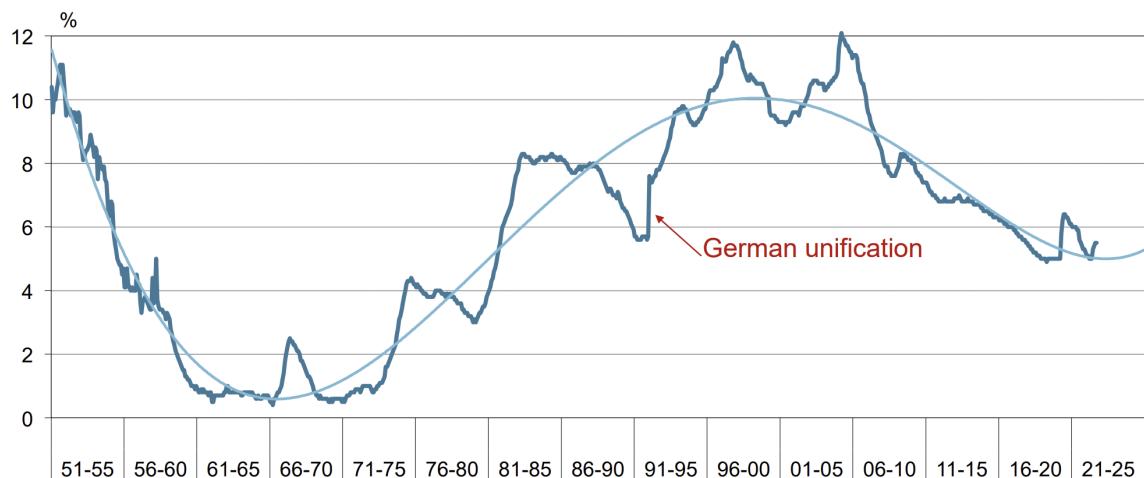
$$NRU = \frac{\text{rate which people loose jobs}}{\text{rate which people find jobs}} \cdot 100$$

This is the **Long-run Problem!**

Cyclical Unemployment: the deviation of unemployment from its natural rate. Refers to the year-to-year fluctuations in unemployment around its natural rate. It is associated with short-term ups and downs of the business cycle.

This is the **Short-run Problem!**

▼ Example: Unemployment rate in Germany

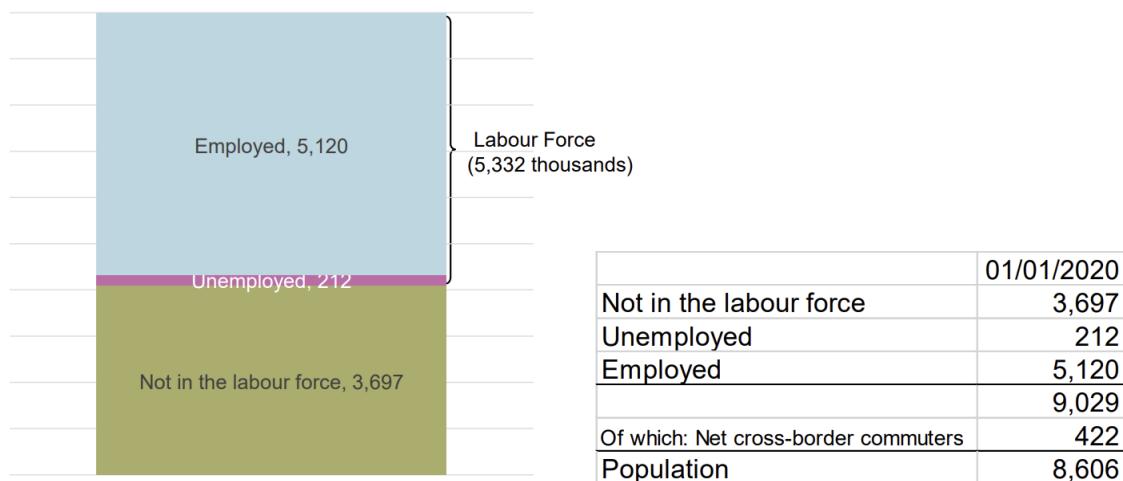


4.2 How does government measure the economy's rate of unemployment?

Labour force: the total number of workers, including both the employed and the unemployed

Not in the Labour Force: People who do not have a job and are either not able or not available to work.

▼ Illustration: The Breakdown of Swiss Population

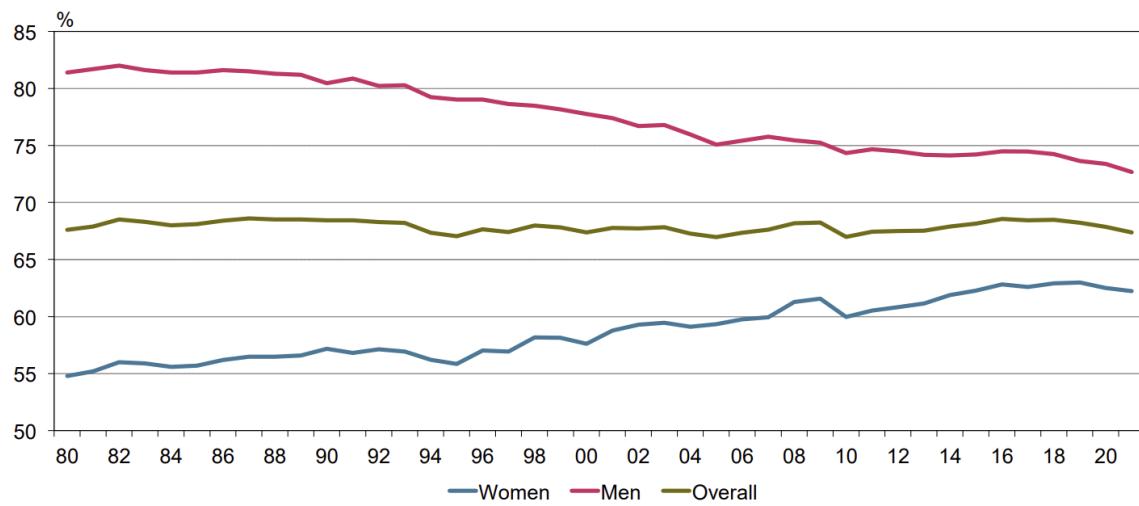


at the start of 2020

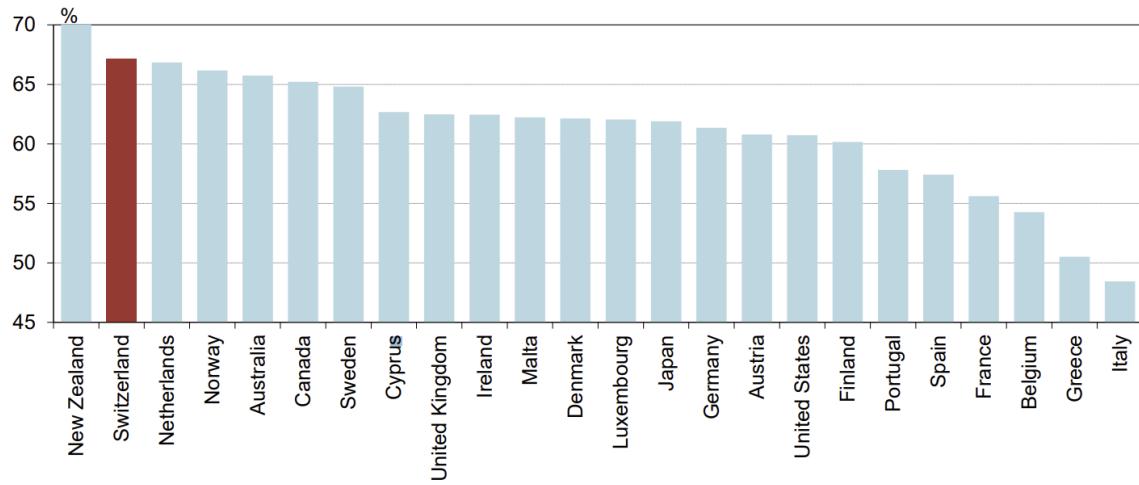
Labour force participation rate: the percentage of the adult population that is in the labour force

$$\text{Labour Force Participation Rate} = \frac{\text{Labour force}}{\text{Adult population}} \cdot 100$$

▼ Labour force participation rates in Switzerland

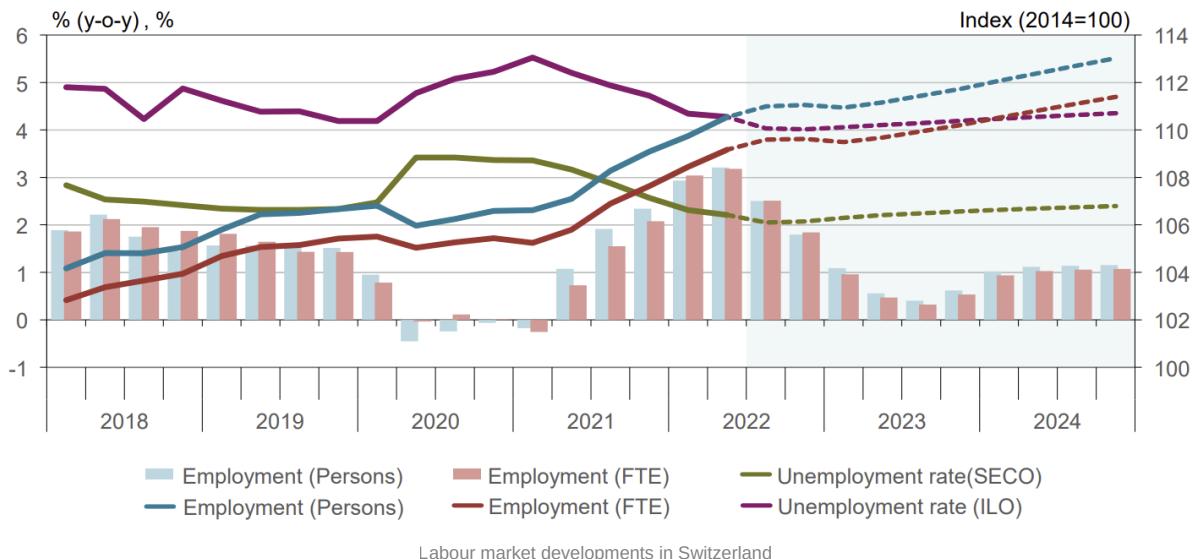


▼ Labour force participation rates around the world (2021)



Unemployment rate: is calculated as the percentage of the labour force that is unemployed

$$\text{Unemployment rate} = \frac{\text{Number of unemployed}}{\text{Labour force}} \cdot 100$$



4.3 What problems arise in interpreting the unemployment data?

Problem: It is difficult to distinguish between a person who is unemployed and a person who is not in the labour force.

Discouraged workers, people who actually would like to work but are discouraged and have given up looking for jobs after unsuccessful searches. Consequently, these don't show up in unemployment statistics anymore and are – with the current measures – considered not to be in the labour force.

Other people may claim to be unemployed in order to receive financial assistance, even though they aren't looking for work or may even have (unregistered) working opportunities.

These instances may confound our measures.

4.4 How long are the unemployed typically without work?

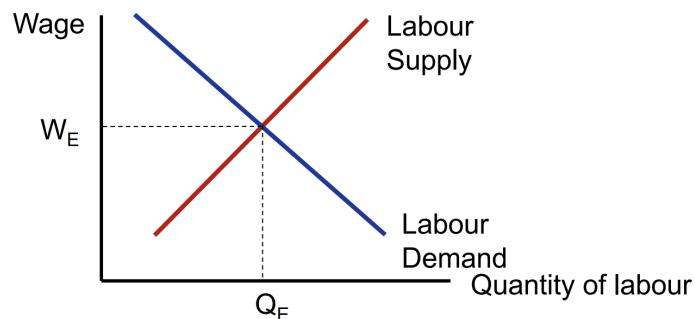
In judging how serious the unemployment problem is, we need to consider the duration of unemployment. Economists have devoted much energy to study data on unemployment duration and come up with an important, subtle and seemingly contradictory finding: «Most spells of unemployment are short, and most unemployment observed at any given time is long term.» Hence, most people who become unemployed will soon find jobs. Yet most of the economy's unemployment problem is attributable to relatively few workers who are jobless for long periods of time.

Hysteresis refers to the effect that the longer people are without work the less likely they are to be hired by firms.

4.5 Why are there always some people unemployed?

In an ideal labour market, wages would adjust to balance the supply and demand for labour, ensuring that all workers would be fully employed.

In **equilibrium** there is no unemployment, because everybody who is willing to work at the given market wage is able to do so (market clears) and everybody who is not working does not want to and will not look for work at current wage levels.



Two different types of unemployment are responsible for long-term unemployment:

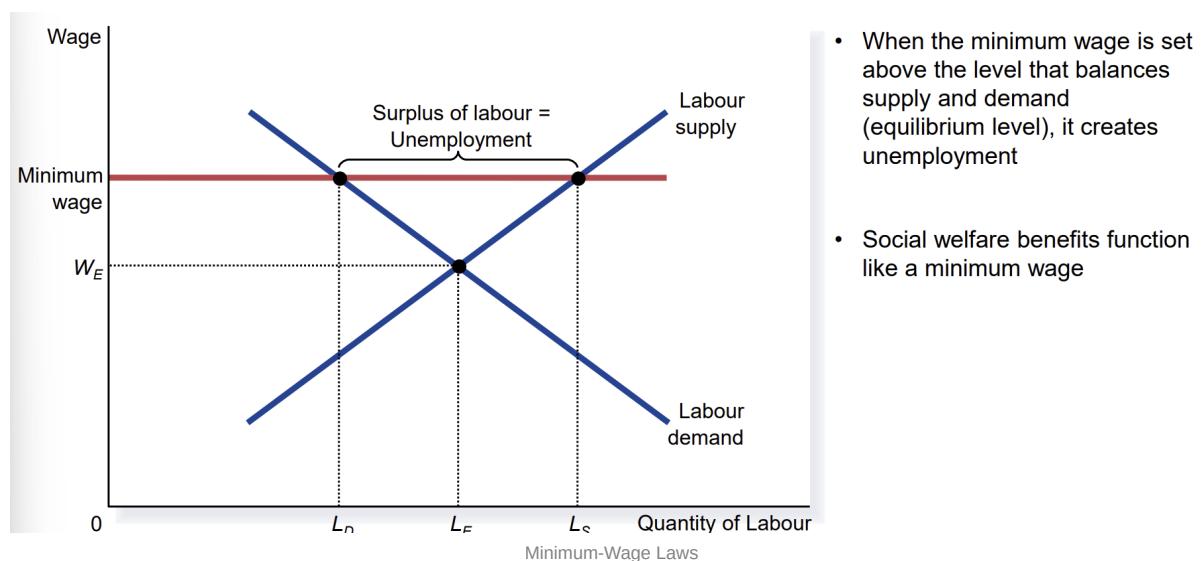
- **Frictional unemployment:** Unemployment that results from the time that it takes to match workers with jobs that are best suit their tastes and skills. This type is often thought to explain relatively short spells of unemployment
- **Structural unemployment:** Unemployment that results because the number of jobs available in some labour markets is insufficient to provide a job for everyone who wants one (labour supply exceeds labour demand). It is often thought to explain longer spells of unemployment.

4.5.1 Job search

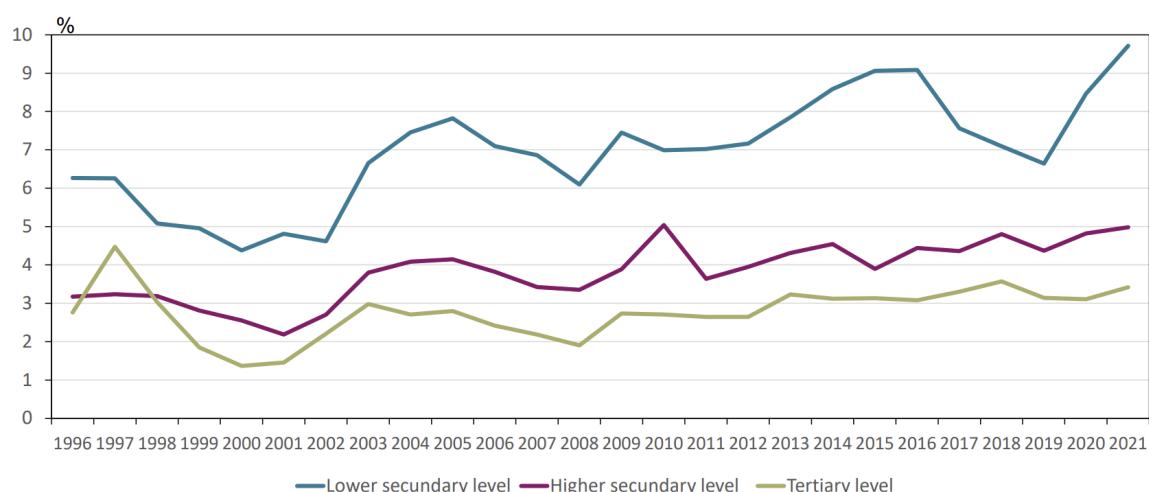
One reason why economies always experience some unemployment is job search. Job search is the process by which workers find appropriate jobs given their tastes and skills. It is not caused by a wage rate higher than equilibrium (as in the case of structural unemployment). It is caused by the time spent searching for the “right” job. Government programs (for Example: employment agencies, training programs, unemployment insurance) can affect the time it takes unemployed workers to find new jobs and firms to find the right people.

4.5.2 Minimum Wage Laws

When the minimum wage is set above the level that balances supply and demand (equilibrium level), it creates unemployment.



▼ Unemployment rate by education level in Switzerland



4.5.3 Unions and Collective Bargaining

A union is a worker association that bargains with employers over wages, benefits and working conditions. A union is a type of cartel attempting to exert its market power (Workers in a union act as a group when discussing

their wages, benefits, and working conditions with their employers). The process by which unions and firms agree on the terms of employment is called collective bargaining.

If the union and firm do not reach agreement, the union can pressure employers to provide a higher wage level by threatening with strikes, i.e. the union organizes a withdrawal of labour from the firm. By raising the wage level above equilibrium level (what they usually do), unions makes some workers better off and other workers worse off.

Empirical Evidence: Union workers earn 10 to 20 percent more than non-union workers.

Are Unions Good or Bad for the Economy as a Whole? Union's influence may be beneficial in some circumstances and adverse in others.

4.5.4 The Theory of Efficiency Wages

Efficiency wages are above-equilibrium wages paid by firms in order to increase worker productivity. The theory of efficiency wages states that firms operate more efficiently if wages are above the equilibrium level. A firm may prefer higher than equilibrium wages for the following reasons:

- **Worker health:** Better paid workers eat a better diet, are healthier and are thus more productive.
- **Worker turnover:** A higher paid worker is less likely to look for another job. Firms save training costs, experienced workers are more productive than newly hired workers.
- **Worker quality:** Higher wages attract a better pool of workers to apply for jobs, because high-quality workers have higher reservation wages.
- **Worker effort:** Higher wages motivate workers to put forward their best effort.

▼ 4.6 Summary of the Chapter

- The unemployment rate is the percentage of those who would like to work but don't have jobs
- The unemployment rate is an imperfect measure of joblessness
- In the Swiss economy, most people who become unemployed find work within a short period of time
- Most unemployment observed at any given time is attributable to a few people who are unemployed for long periods of time
- One reason for unemployment is the time it takes for workers to search for jobs that best suit their tastes and skills
- A second reason why our economy always has some unemployment is minimum-wage laws. Minimum-wage laws raise the quantity of labour supplied and reduce the quantity demanded
- A third reason for unemployment is the market power of unions
- A fourth reason for unemployment is suggested by the theory of efficiency wages: High wages can improve worker health, lower worker turnover, increase worker effort, and raise worker quality

5. Saving, Investment and the Financial System

Chapter 23

5.1 Financial Institutions

Financial System: the group of institutions in the economy that help to match one person's saving with another person's investment.

Financial markets are the institutions through which savers can directly provide funds to borrowers (like bond- and stock markets)

A **bond** is a certificate of indebtedness that specifies obligations of the borrower to the bond holder.

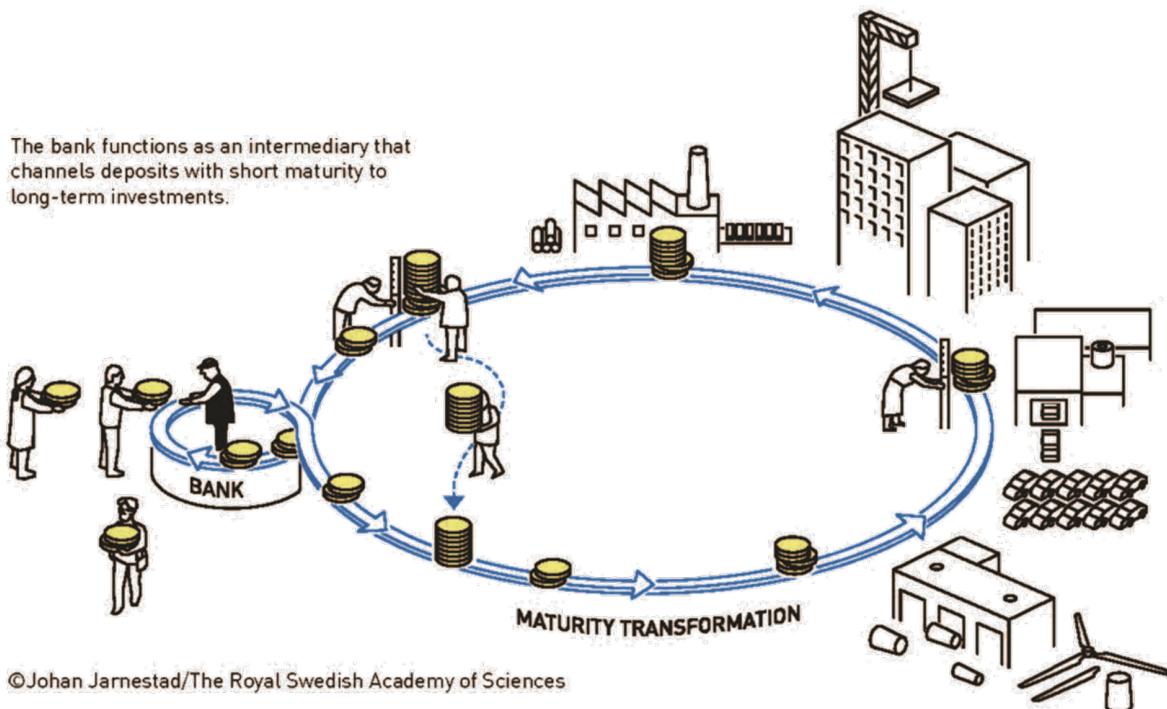
A **stock** represents a claim to partial ownership in a firm and is a claim to the profits that the firm makes.

Financial Intermediaries are financial institutions through which savers can indirectly provide funds to borrowers (like Banks and Funds)

Banks: take deposits from people who want to save and use these to lend to those who want to borrow. They help to create a medium of exchange by providing non-cash payment methods

Mutual Funds / Investment Funds: A mutual fund is an institution that sells shares to the public and uses the proceeds to buy a portfolio, of various types of stocks, bonds, or both.

Other Financial Institutions: Credit unions, Pension funds, Insurance companies, Loan sharks



The role of the financial sector

5.2 Saving and Investment

Recall that GDP (Y) is both total income in an economy and total expenditure on the economy's output of goods and services:

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

Assume a closed economy – one that does not engage in international trade ($X=M=NX=0$):

$$Y = C + I + G$$

Now, subtract C and G from both sides of the equation:

$$Y - C - G = I$$

The left side of the equation is the total income in the economy after paying for consumption and government purchases and is called national saving, or just saving (S). Substituting S for $Y - C - G$, the equation can be written as:

$$S = I$$

National saving: the total income in the economy that remains after paying for consumption and government purchases

National saving, or saving, is equal to:

$$S = Y - C - G$$

$$Taxes$$

$$Taxes$$

$$S = \underbrace{(Y - \overbrace{T}^{Taxes} - C)}_{\text{private saving}} + \underbrace{(\overbrace{T}^{Taxes} - G)}_{\text{public saving}}$$

Private Saving: The part of income that households have left after paying taxes and paying for their consumption.

Public Saving: Public saving is the amount of tax revenue (T) that the government has left after paying for its spending. If $T > G$, the government runs a budget surplus because it receives more money than it spends. If $G > T$, the government runs a budget deficit because it spends more money than it receives in tax revenue. The accumulation of past budget deficits is called the government debt.

▼ Government Budget Balances ($T-G$) and Gross Government Debt in selected countries

	Gross debt (as % of GDP)				Fiscal balance (as % of GDP)			
	2014–2019	2020	2021	2022	2014–2019	2020	2021	2022
Germany	66.8	68.7	69.3	66.4	1.2	-4.3	-3.7	-2.5
France	97.0	114.6	112.9	111.2	-3.2	-8.9	-6.5	-4.6
Italy	134.7	155.3	150.8	147.9	-2.3	-9.6	-7.2	-5.5
Spain	102.0	120.0	118.4	115.1	-4.1	-10.3	-6.9	-4.9
Netherlands	58.7	54.3	52.1	51.4	0.0	-3.7	-2.5	-2.7
Belgium	102.8	112.8	108.2	107.5	-1.9	-9.0	-5.5	-5.0
Austria	79.2	83.3	82.8	80.0	-0.9	-8.0	-5.9	-3.1
Euro area	90.8	99.2	97.4	94.7	-1.3	-7.1	-5.1	-3.7
United States	105.8	132.8	128.8	123.4	-5.3	-15.3	-11.7	-5.7
China	48.8	68.1	73.3	77.8	-3.4	-10.7	-6.0	-7.7
Japan	232.4	259.0	264.9	265.2	-3.6	-9.0	-11.2	-10.2
United Kingdom	85.1	102.5	102.8	100.2	-3.4	-12.8	-8.3	-3.9
Switzerland	40.7	42.4	42.2	41.5	0.7	-2.8	-0.7	0.0

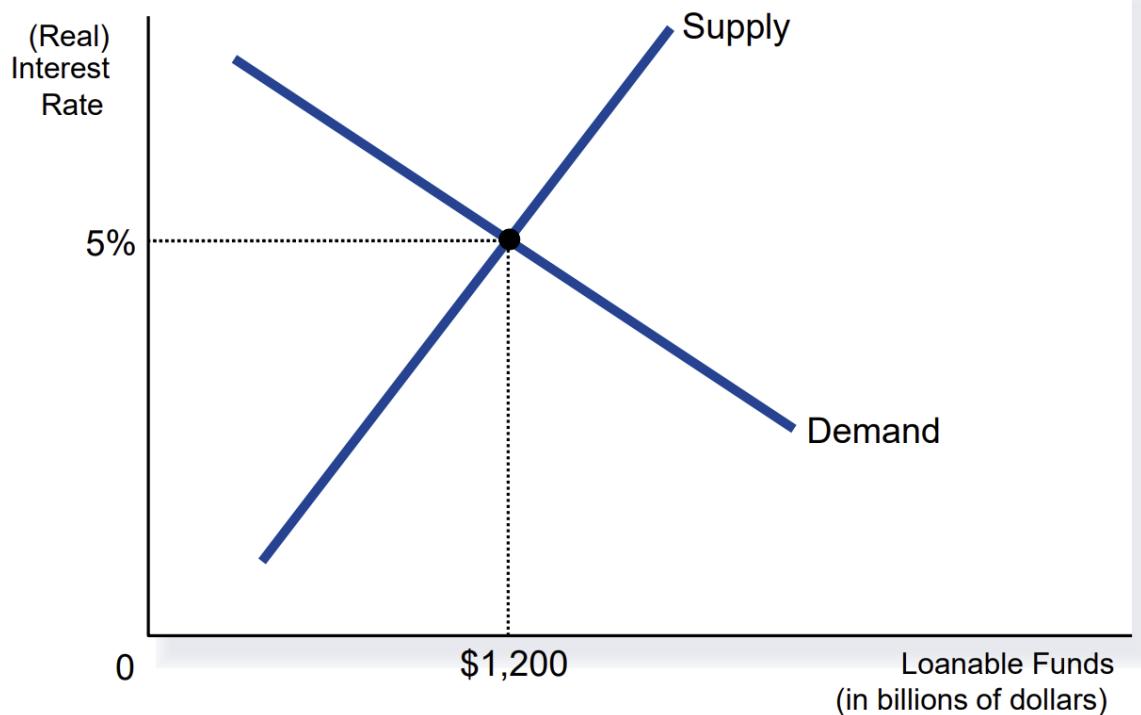
5.3 The Market for Loanable Funds

The savings and investment rate determines the growth rate and long-run level of GDP. Saving and investment are coordinated on the financial market. We will assume for simplicity that the economy has only one financial market. This market for loanable funds is the market in which those who want to save supply funds and those who want to borrow to invest demand funds.

Loanable funds refers to all income that people have chosen to save and lend out, rather than use for their own consumption.

The price for a loanable fund is the (real) interest rate. It reflects the amount borrowers pay for loans and lenders receive on their saving. Financial markets work much like other markets in the economy. The equilibrium of the supply and demand for loanable funds determines the real interest rate.

Loanable funds are the total amount of money available in the economy for borrowing. They are created when people save money and deposit it into banks, which can then lend it out. Loanable funds enable businesses to invest in new projects, households to purchase homes, and governments to finance public works. The demand for loanable funds is determined by the interest rate, which balances the supply and demand for funds.



The Market for Loanable Funds - Graphical Illustration

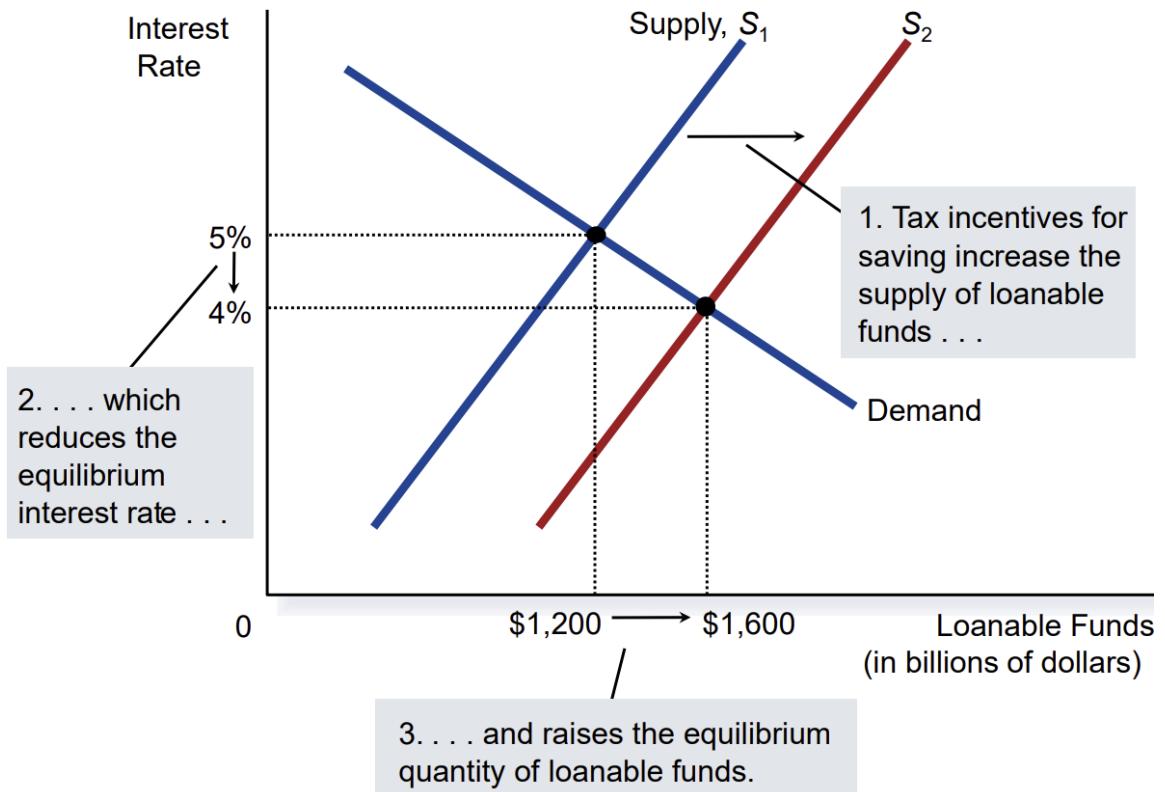
5.4 Government Policies to affect Savings and Investment

5.4.1 Taxes and saving

Taxes on interest income substantially reduce the future payoff from current saving and, as a result, reduce the incentive to save.

A tax decrease increases the incentive for households to save at any given interest rate

- ⇒ The supply of loanable funds curve shifts right
- ⇒ The equilibrium interest rate decreases
- ⇒ The equilibrium quantity of loanable funds increases

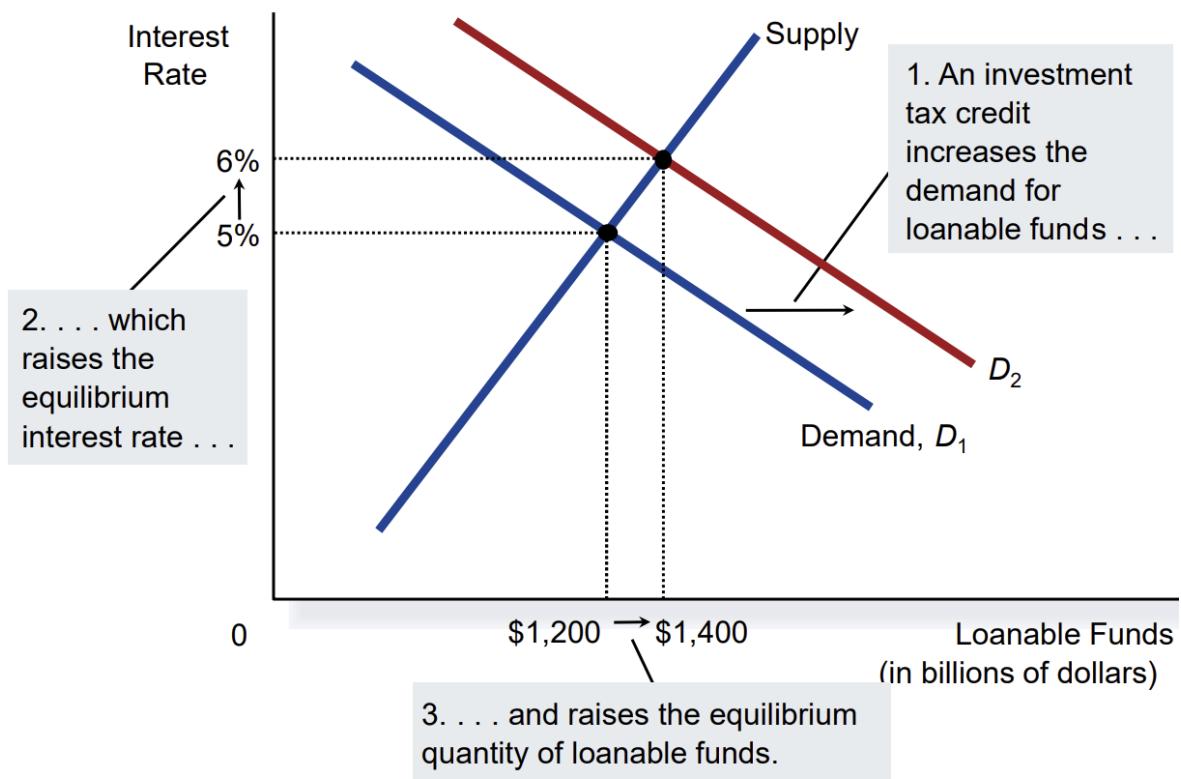


An Increase in the Supply of Loanable Funds

5.4.2 Taxes and investment

An investment tax credit:

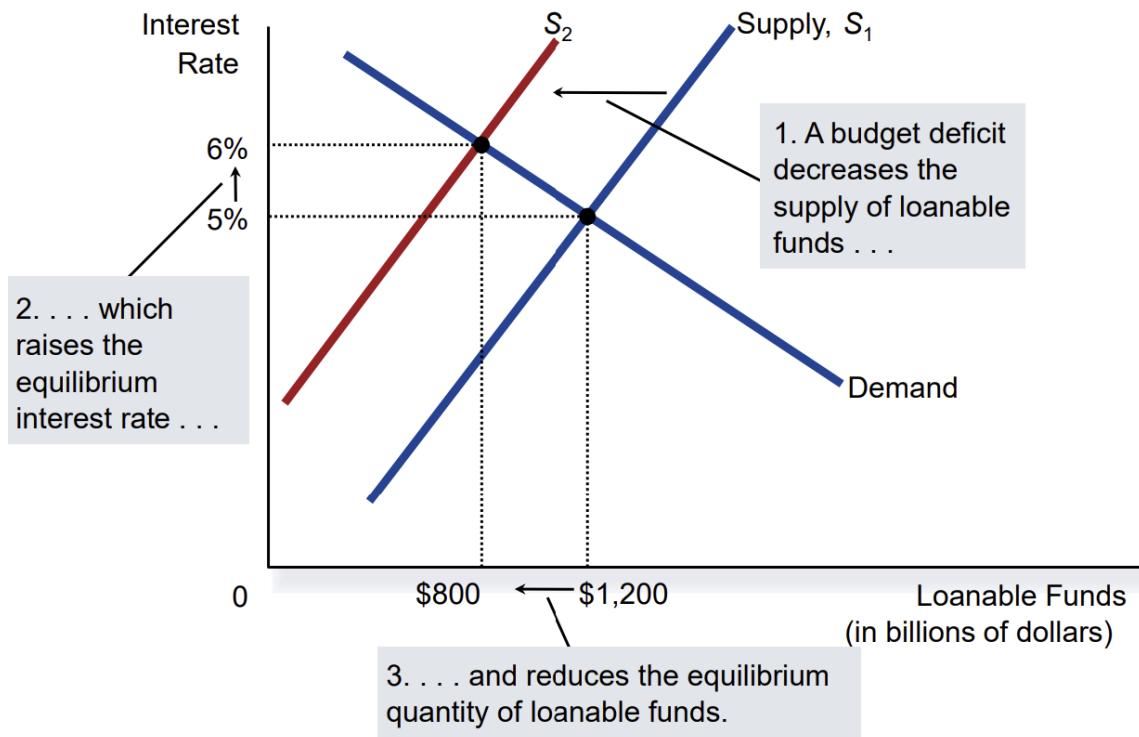
- ⇒ increases the incentive to borrow
- ⇒ increases the demand for loanable funds
- ⇒ shifts the demand curve to the right
- ⇒ results in a higher interest rate and a greater quantity saved



5.4.3 Government budget deficits and surpluses

Government borrowing to finance its budget deficit reduces the supply of loanable funds available to finance investment by households and firms.

- A budget deficit decreases the supply of loanable funds.
- ⇒ Shifts the supply curve to the left
- ⇒ Increases the equilibrium interest rate and reduces the equilibrium quantity of loanable funds
- ⇒ The associated fall in investment is referred to as crowding out
- ⇒ The deficit borrowing crowds out private borrowers who are trying to finance investments



The Effect of a Government Budget Deficit

▼ 5.5 Summary of the Chapter

- The financial system is made up of financial institutions such as the bond market, the stock market, banks, and mutual funds
- All these institutions act to direct the resources of households who want to save some of their income into the hands of households and firms who want to borrow
- National income accounting identities reveal some important relationships among macroeconomic variables
- In particular, in a closed economy, national saving must equal investment
- The savings and investment rate determines the growth rate and long-run level of GDP and consumption
- Financial institutions attempt to match one person's saving with another person's investment
- The interest rate is determined by the supply and demand for loanable funds
- The supply of loanable funds comes from households who want to save some of their income
- The demand for loanable funds comes from households and firms who want to borrow for investment
- National saving equals private saving plus public saving
- A government budget deficit represents negative public saving and, therefore, reduces national saving and the supply of loanable funds
- When a government budget deficit crowds out investment, it reduces the growth of productivity and GDP

6. The Monetary System

Chapter 24

6.1 The Meaning of Money

6.1.1 Definitions

Barter: the exchange of one good or service for another ("Tauschhandel")

Money: the set of assets in an economy that people regularly use to buy goods and services from other people

Money has three functions in the economy (and these are really the characteristics of money, i.e. the definition): it is a medium of exchange, a unit of account and a store of value.

1. **Medium of Exchange:** A medium of exchange is an item that buyers give to sellers when they want to purchase goods and services. Anything that is readily acceptable as payment.
2. **Unit of Account:** A unit of account is the yardstick people use to post prices and record debts.
3. **Store of Value:** A store of value is an item that people can use to transfer purchasing power from the present to the future.

Liquidity: the ease with which an asset can be converted into the economy's medium of exchange

Example: Most bonds and stocks can be sold easily with small cost, so they are liquid assets. By contrast, selling a car requires more time and effort, so these assets are less liquid.

Commodity Money: money that takes the form of a commodity with intrinsic value
(For example: gold, silver, cigarettes)

Fiat Money: money without intrinsic value that is used as money because of government decree
(For example: coins, currency, check deposits)

Money stock: the quantity of money circulating in the economy

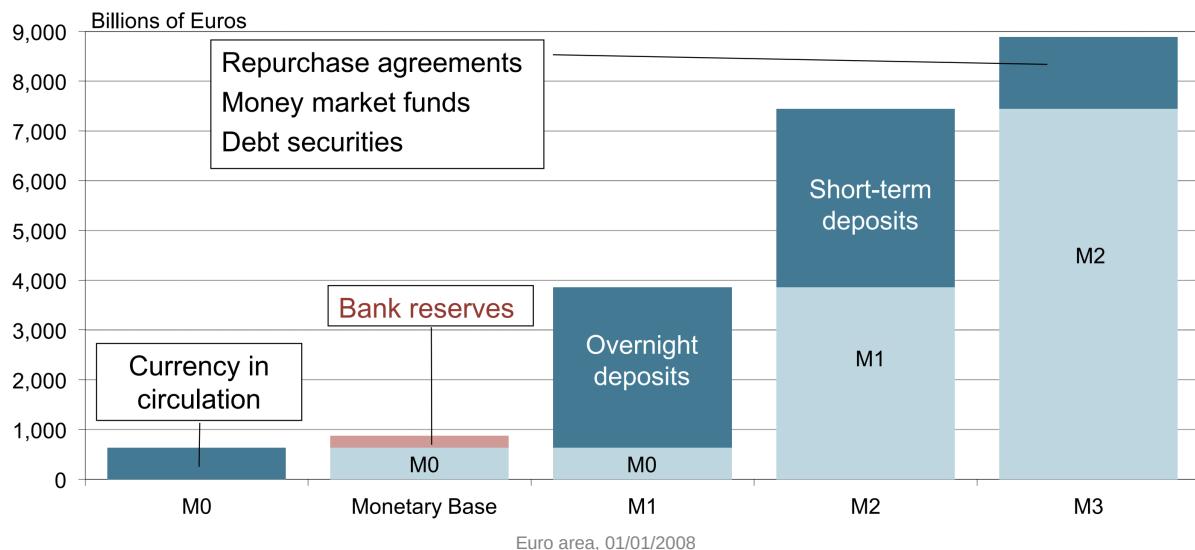
Currency: the paper banknotes and coins in the hands of the public

Demand deposits: balances in bank accounts that depositors can access on demand, for example by using a debit card

6.1.2 Measures of the Money stock

There are many assets that have some money-characteristics (currency, checking accounts, saving accounts, money market funds, etc.) and there is no single precise measure of money. In a complex economy, it is therefore not easy to draw a line between assets that can be called "money" and assets that cannot. Therefore various measures of the money stock are available:

- **Monetary Base** (the currency in circulation and the bank reserves, i.e. the money that the central bank directly controls (and only this money!))
- **M1** (a "narrow" monetary aggregate that comprises currency in circulation and overnight deposits)
- **M2** (an "intermediate" monetary aggregate that comprises M1 plus deposits with an agreed maturity of up to two years and deposits redeemable at notice of up to three months)
- **M3** (a "broad" monetary aggregate that comprises M2 plus repurchase agreements, money market fund shares and units as well as debt securities with a maturity of up to two years)



6.2 The role of the Central Banks

Central Bank: an institution designed to regulate the quantity of money in the economy

The central bank of an economy is an important institution because changes in the money supply can profoundly affect the economy. The central bank's policy decisions have an important influence on the economy's rate of inflation in the long run and the employment and production in the short run. They are often called "the guardians of price/inflation stability".

Money Supply: the quantity of money available in the economy

Most central banks have two main functions:

1. Act as a [banker's bank](#), making loans to banks and as a lender of last resort.
 - Assuring financial stability.
2. Conducts [monetary policy](#)
 - by [controlling the money supply](#)
 - by controlling the internal value of the currency ([price stability](#))
 - by controlling the external value of the currency ([exchange rate](#))

Monetary Policy: the set of actions taken by the central bank to affect the money supply

6.2.1 The European Central Bank & the Eurosystem

The European Central Bank is the overall central bank of the 19 countries comprising the European Monetary Union. The ECB was officially created on 1 June 1998 and is located in Frankfurt. It came into being because 11 countries of the European Union had decided that they wished to enter European Monetary Union and use the same currency. The primary objective of the ECB is to promote price stability throughout the euro area. An important feature of the ECB and the Eurosystem is its independence. The Eurosystem is the system made up of the ECB plus the national central banks of the 19 countries comprising the European Monetary Union.

6.3 Banks and the Money Supply

Banks can influence the quantity of demand deposits in the economy and the money supply.

Reserves are deposits that banks have received but have not been lend out.

In a [fractional-reserve banking](#) system, banks hold a fraction of the money deposited as reserves and lend out the rest.

The **reserve ratio** is the fraction of deposits that banks hold as reserves.

As we will see, when a bank makes a loan from its reserves, the money supply increases. The money supply is affected by the amount deposited in banks and the amount that banks lend out.

- Deposits into a bank are recorded as liabilities.
- The fraction of total deposits that a bank has to keep as reserves is called the reserve ratio.
- Loans become an asset to the bank.

6.3.1 Money Creation with Fractional-Reserve Banking

When one bank loans money, that money is generally deposited into another bank. This creates more deposits and more reserves to be lent out. When a bank makes a loan from its reserves, the money supply increases. But how much money is eventually created by the new deposit in this economy?

Example: With a reserve requirement of 20%, the money multiplier is $\frac{1}{20\%} = \frac{1}{0.2} = 5$

The money multiplier is the amount of money the banking system generates with each dollar of reserves.

$$\text{Money multiplier} = \frac{1}{\text{reserve ratio}}$$

▼ Money Multiplier: An example

This T-Account shows a bank that accepts deposits, keeps a portion as reserves, and lends out the rest.

Let us assume a reserve ratio of 10%.

From a situation without this bank (i.e. households holding \$100 in cash instead of deposits), introducing this bank and using a 10% reserve ratio will increase the money supply (M_1, M_2, M_3) by \$90 (to \$190). M_0 (actually base money) stays at \$100 = \$90 + \$10.

First National Bank	
Assets	Liabilities
Reserves \$10.00	Deposits \$100.00
Loans \$90.00	
Total Assets \$100.00	Total Liabilities \$100.00

First National Bank		Second National Bank	
Assets	Liabilities	Assets	Liabilities
Reserves \$10.00	Deposits \$100.00	Reserves \$9.00	Deposits \$90.00
Loans \$90.00		Loans \$81.00	
Total Assets \$100.00	Total Liabilities \$100.00	Total Assets \$90.00	Total Liabilities \$90.00

Increase in the Money Supply (M_1) = \$81.00!

Now we calculate, how much money we can create from this \$100.00:

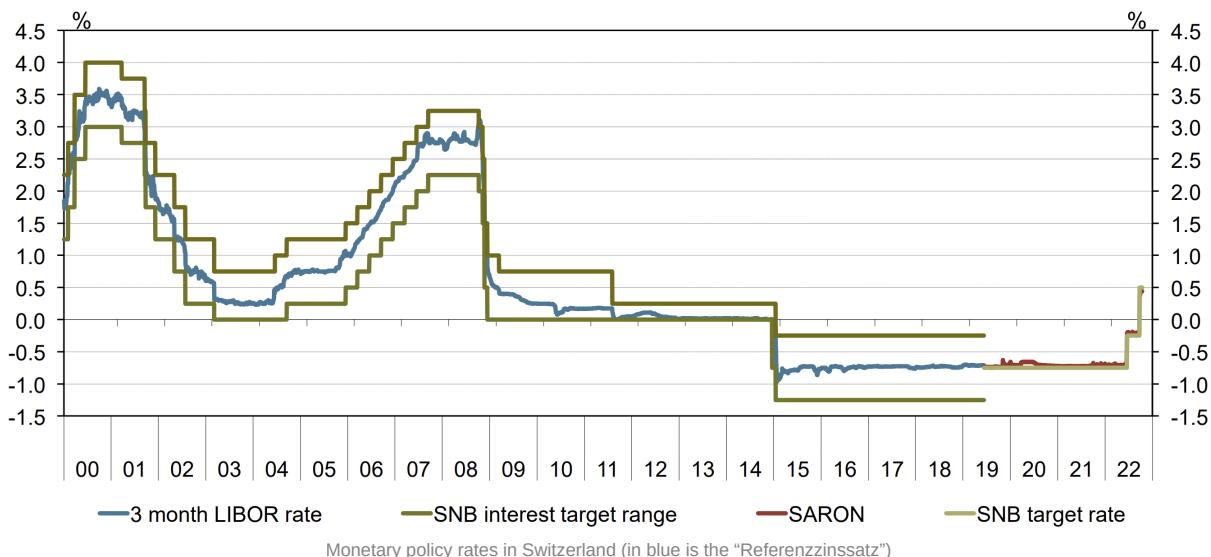
Original deposit = \$100.00
 1st Natl. Lending = \$90.00 = $0.9 \cdot \$100.00$
 2nd Natl. Lending = \$81.00 = $0.9 \cdot \$90.00$
 3rd Natl. Lending = \$72.90 = $0.9 \cdot \$81.00$)
 ... and on until there are just pennies left to lend!

Total money created by this \$100.00 deposit in the banking sector is $\$900.00 = \frac{1}{0.10} \cdot \$100.00 - \$100.00 =$
 Money multiplier · initial deposit

6.4 The Central Bank's (conventional) Tools of Monetary Control

Central banks in many developed economies have a central function of maintaining economic stability and stable inflation. The principal way they seek to achieve these objectives is through influencing the price of money in the economy through setting interest rates. A central bank has three main tools in its monetary toolbox: open market operations, the discount rate and reserve requirements.

- **Open-Market Operations** (in the ECB case using the Main Refinancing Rate as “price”): The central bank conducts open-market operations when it buys government bonds from or sells government bonds to the public. When the CB buys government bonds, the money supply increases. The money supply decreases when the CB sells government bonds.
- **Reserve Requirements:** Reserve requirements are regulations on the minimum amount of reserves that banks must hold against deposits. Increasing the reserve requirement decreases the money supply. Decreasing the reserve requirement increases the money supply.
- **The Discount Rate** (ECB terminology: the Marginal Lending Rate): The discount rate is the interest rate the CB charges banks for loans. Increasing the discount rate decreases the money supply. Decreasing the discount rate increases the money supply.

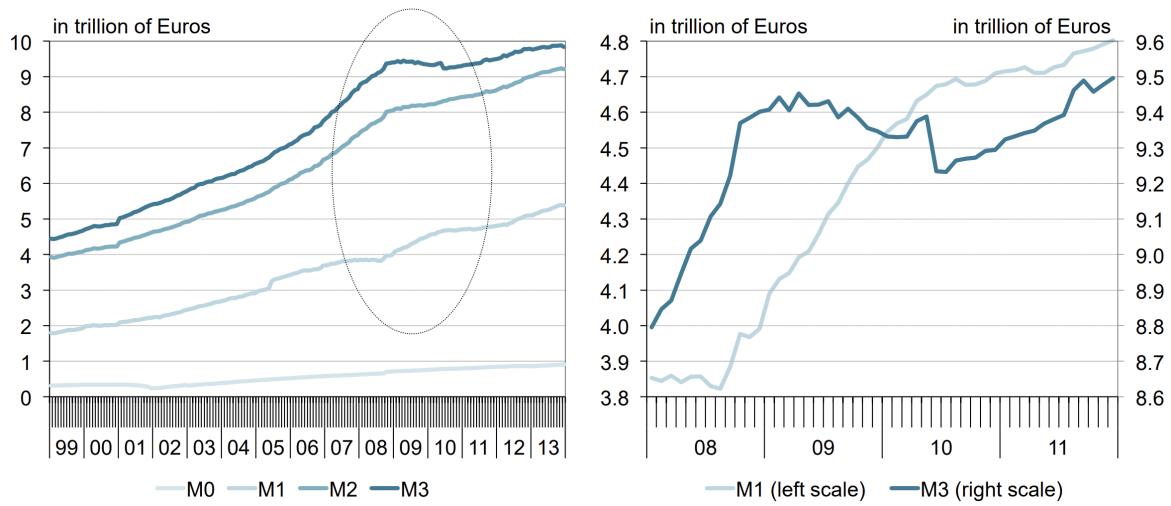
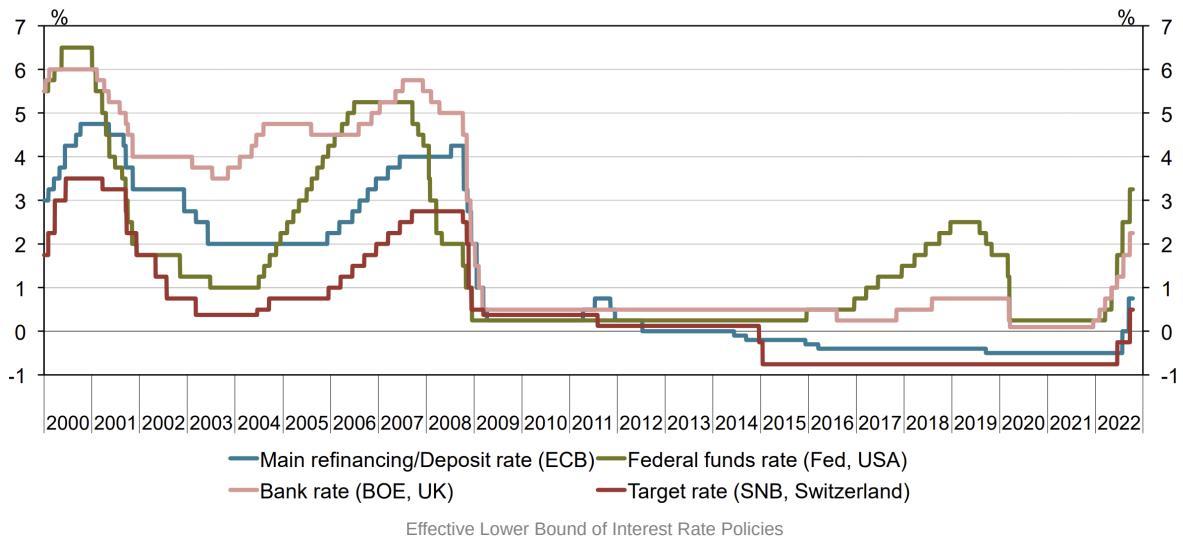


6.5 Problems in Controlling the Money Supply

The Central Bank's control of the money supply is not precise. The Central Bank must wrestle with two problems that arise due to fractional-reserve banking:

1. The Central Bank does not control the amount of money that households choose to hold as deposits in banks.
2. The Central Bank does not control the amount of money that bankers choose to lend and/or the private sector chooses to borrow.

▼ 6.6 Impacts of the great Financial Crisis (2008)

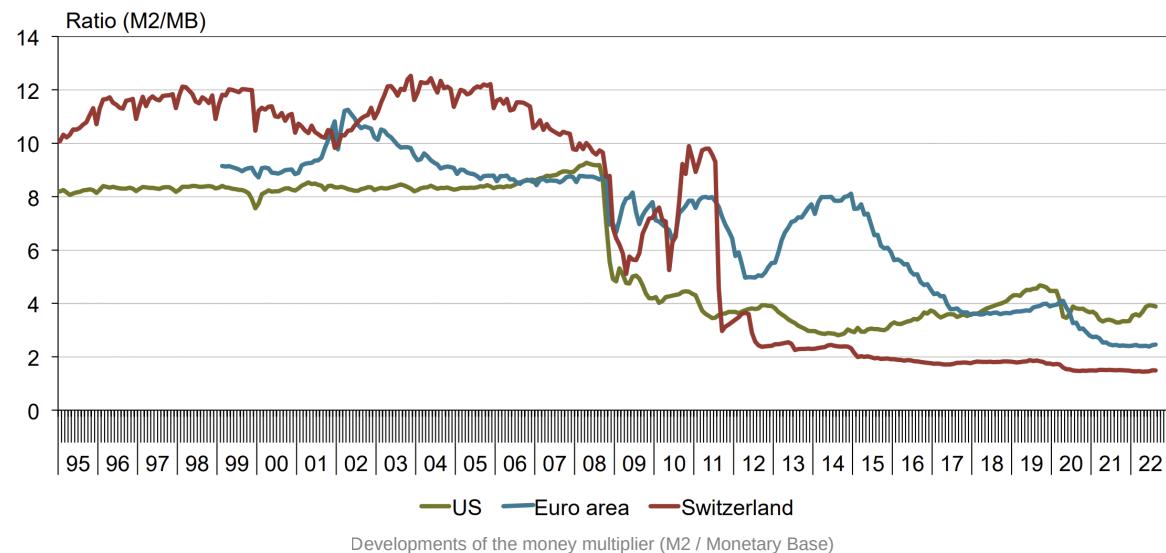
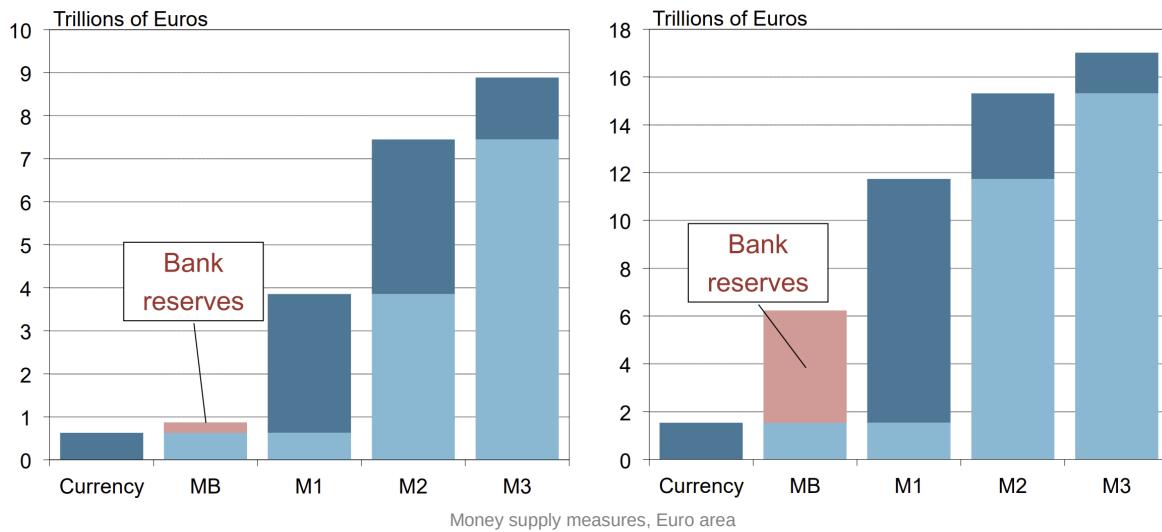


Symbol Assets included	Switzerland 01/01/2008 Amount (in blns) ratio to MB	Switzerland 01/09/2022 Amount (in blns) ratio to MB	Euro Area 01/01/2008 Amount (in blns) ratio to MB	Euro Area 01/09/2022 Amount (in blns) ratio to MB	CH EA Avg. annual growth rate
MB Currency + Bank reserves	SFr. 47	SFr. 730	€ 842	€ 6,226	20.6% 14.6%
M2 M1 + small time deposits, savings deposits, money market deposit accounts	SFr. 458 9.8	SFr. 1,094 1.5	€ 7,355 8.7	€ 15,310 2.5	6.1% 5.1%
M3 M2 + large time deposits, repurchase agreements, institutional money market mutual fund balances, debt securities	SFr. 641 13.7	SFr. 1,158 1.6	€ 8,650 10.3	€ 16,059 2.6	4.1% 4.3%

Measures for monetary aggregates, 2008 vs. today

01/01/2008

01/09/2022



▼ 6.7 Summary of the Chapter

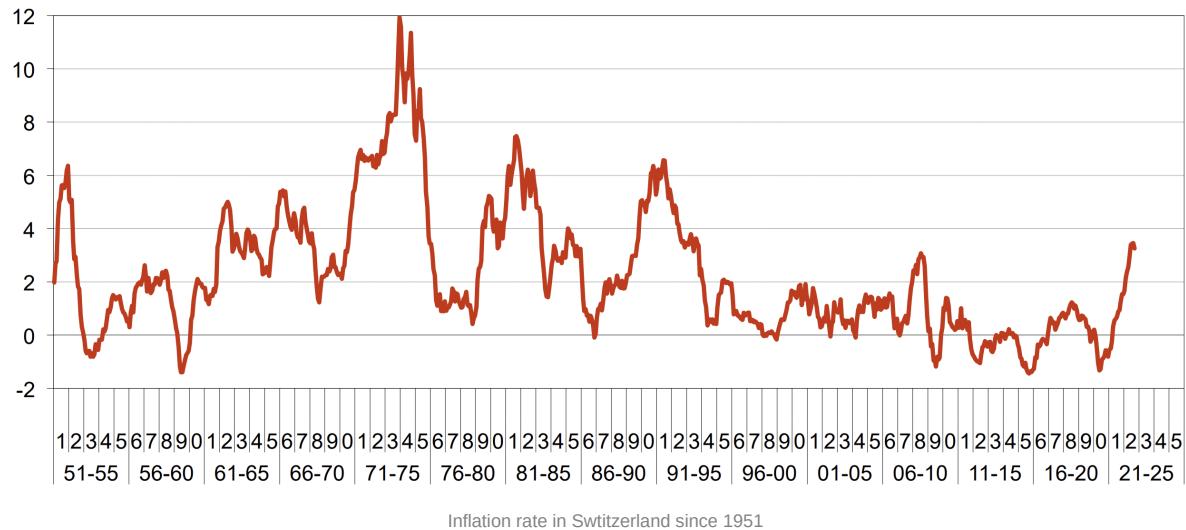
- The term money refers to assets that people regularly use to buy goods and services.
- Money serves three functions in an economy: as a medium of exchange, a unit of account, and a store of value.
- Commodity money is money that has intrinsic value.
- Fiat money is money without intrinsic value.
- It is the function of a central bank to control the money supply through open-market operations, or by changing the refinancing rate, or by adjusting reserve requirements.
- When banks loan out their deposits, they increase the quantity of money in the economy.
- Quantitative easing is when the central bank injects money into banks in order to encourage lending.
- Because the central bank cannot control the amount bankers choose to lend or the amount households choose to deposit in banks, the central bank's control of the money supply is imperfect.

7. Money, Growth and Inflation

Chapter 24

Inflation: an increase in the price level over a period of time

Deflation: a fall in the price level over a period occurring when the inflation rate is less than 0 per cent



Inflation is an economy-wide phenomenon that concerns the value of the economy's medium of exchange.

Overall price level rises \Rightarrow value of money falls

7.1 Money Supply, Money Demand, and Monetary Equilibrium

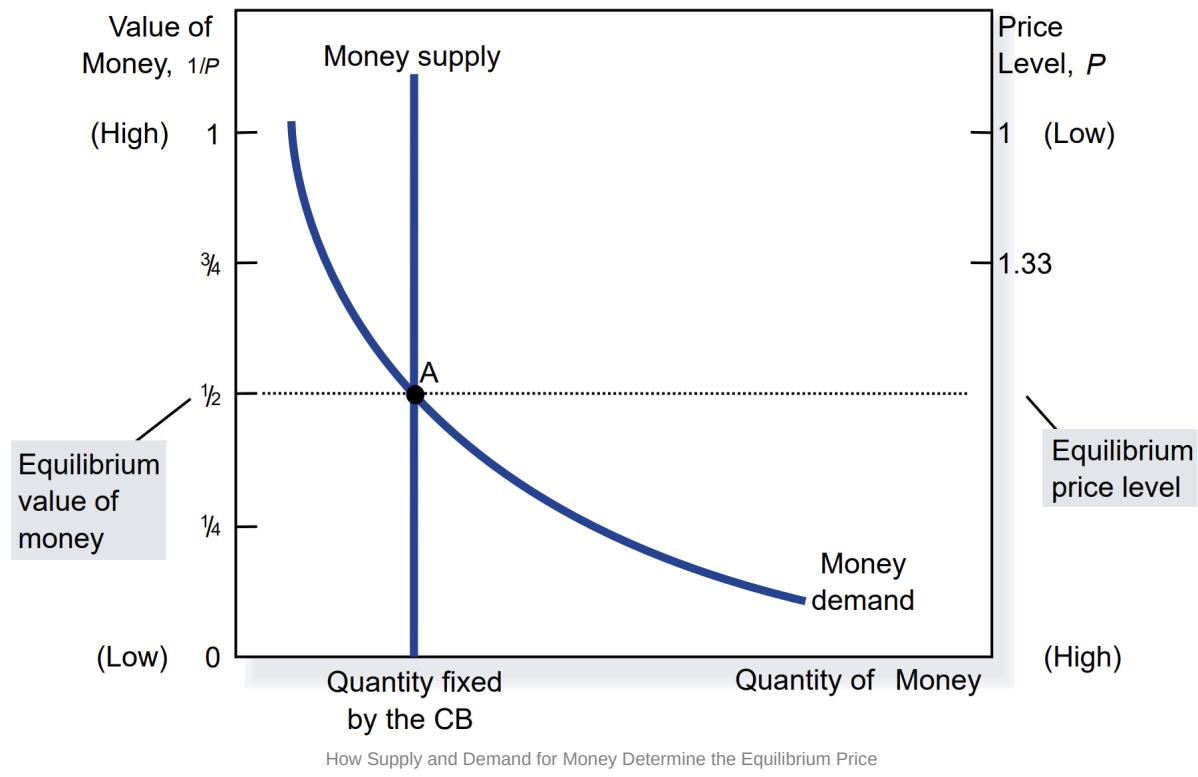
The value of money is determined by the supply and demand for money.

The **money supply** is a policy variable that is controlled by the central bank (Through instruments such as open-market operations, the CB affects the quantity of money supplied). Therefore the supply of money is (assumed to be) vertical (perfectly inelastic).

Money demand has several determinants, including interest rates and the average level of prices in the economy. People hold money because it is the medium of exchange. The amount of money people choose to hold depends on the prices of goods and services. Therefore the lower the value of money the higher the demand.

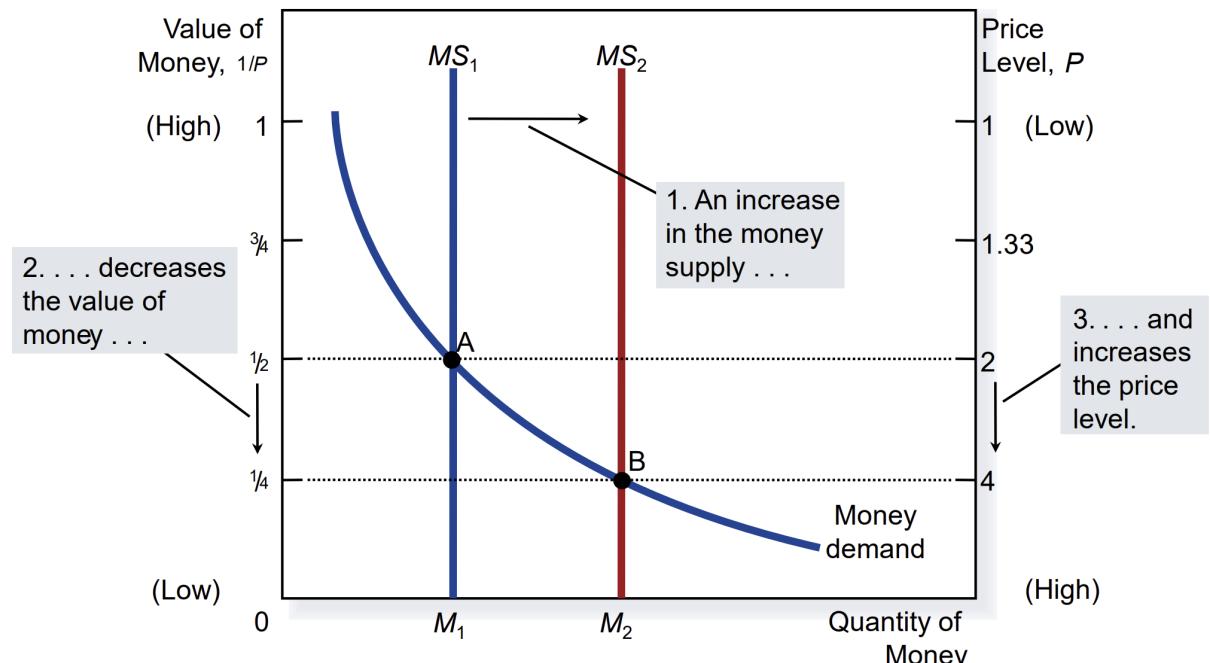
In the long run, the overall level of prices adjusts to the level at which the demand for money equals the supply.

At the **equilibrium** (point A), the quantity of money demanded balances the quantity of money supplied.



7.2 Monetary Injection (increase in money supply)

When the central bank increases the supply of money, the money supply curve shifts from M_1 to M_2 and the equilibrium point from A to B. As a result: The value of money and the price level adjust to bring supply and demand back into balance.



Increase in the money supply \Rightarrow Increase in the demand for goods and services \Rightarrow the price level increases \Rightarrow the value of money decreases

Quantity theory of money: a theory asserting that the quantity of money available determines the price level and that the growth rate in the quantity of money available determines the inflation rate.

7.3 The Classical Dichotomy and Monetary Neutrality

Nominal variables are variables measured in monetary units

Real variables are variables measured in physical units

In the long run, real economic variables do not change with changes in the money supply. According to the **classical dichotomy**, different forces influence real and nominal variables.

Monetary neutrality: the proposition that changes in the money supply do not affect real variables but nominal variables

Example: When the central bank doubles the money supply, the price level doubles, the euro wages doubles, and all other nominal variables double. But real variables, such as production, unemployment, real wages and real interest rates are unchanged.

7.4 Velocity and the Quantity Equation

How many times per year is the typical 1\$ coin used to pay for a newly produced good or service?

Velocity of Money: the rate at which money changes hands

$$V = \frac{\text{nominal GDP}}{\text{Quantity of Money}} = \frac{\overbrace{(\text{GDP deflator}) \times (\text{real GDP})}^{\text{price level}}}{\text{Quantity of Money}} = \frac{P \cdot Y}{M}$$

▼ Example

Suppose a economy produces 100 pizzas a year, a pizza costs 10\$, and the quantity of money in the economy is 50\$. $\Rightarrow V = \frac{10\$ \cdot 100}{50\$} = 20$. A total of 1000\$ is spent in the economy per year on pizza (100 pizzas and each costs 10\$). With only 50\$ of money in the economy, each 1\$ coin must be spent on average 20 times per year.

Rewriting the equation gives the **quantity equation**.

$$M \cdot V = P \cdot Y \quad (\Leftrightarrow V = \frac{P \cdot Y}{M})$$

(quantity of money) x (velocity of money) = nominal GDP

The quantity equation relates the quantity of money to the nominal value of output.

The quantity equation shows that an increase in the quantity of money in an economy must be reflected in one of three other variables:

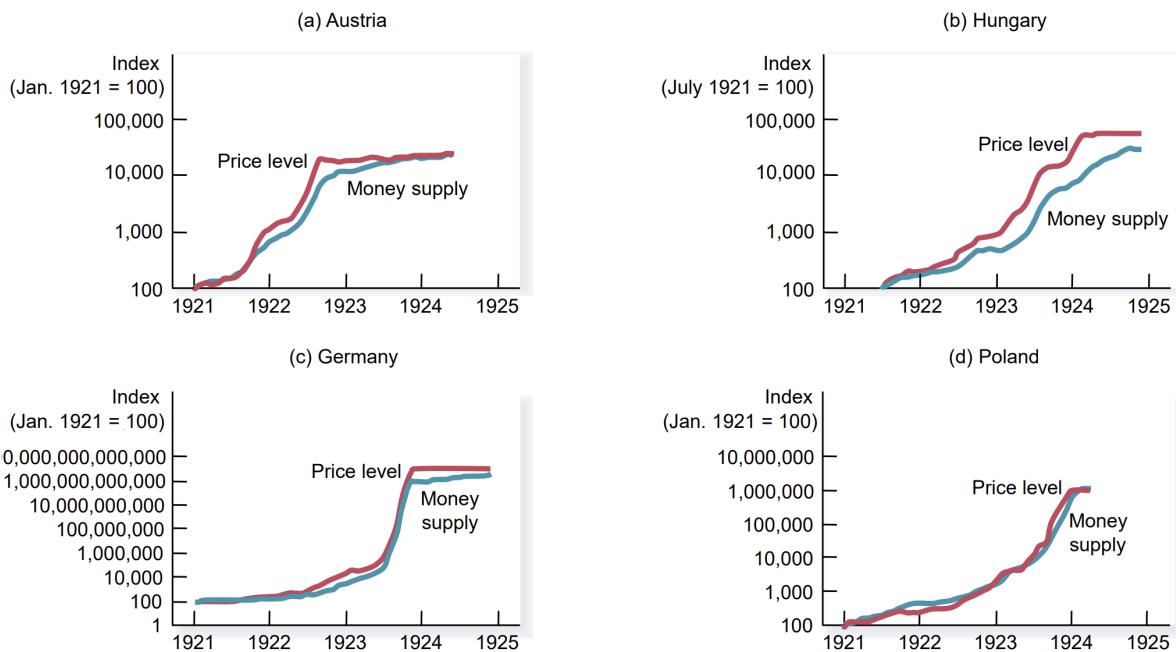
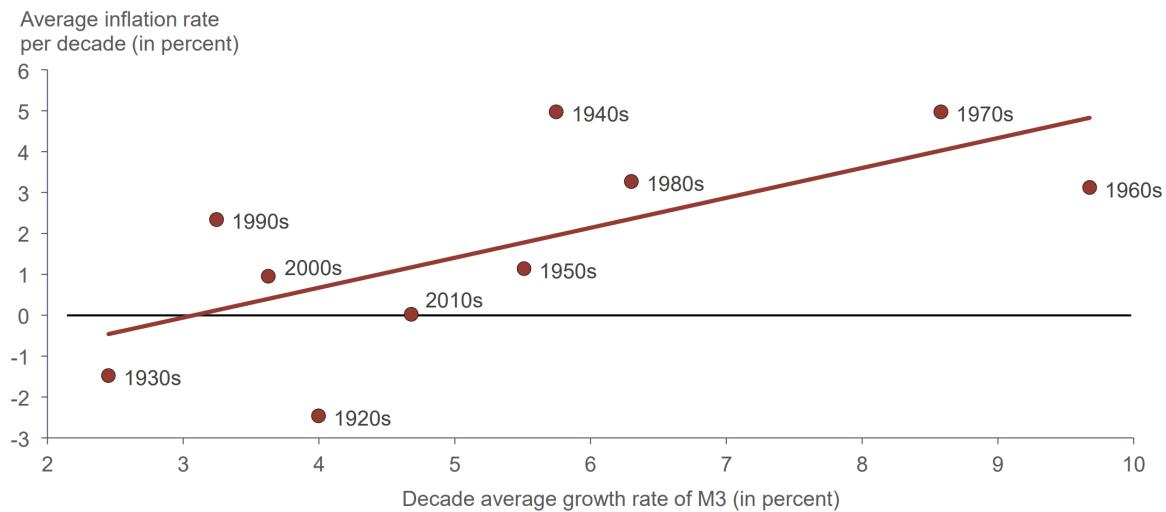
Increase in the money supply:

- ⇒ the price level (P) increases
- ⇒ the quantity of output (Y) increases
- ⇒ the velocity of money (V) decreases

The **Quantity Theory of Money** states the following:

- The velocity of money (V) is relatively stable over time.
- When money (M) changes, it causes changes in the nominal value of output ($P \times Y$).
- Because money is (in the long-run) neutral (Y is determined on goods and service markets), money (M) does not affect output (Y).

▼ Swiss data on inflation and money growth



Money and Prices During Four Hyperinflations in the 1920s

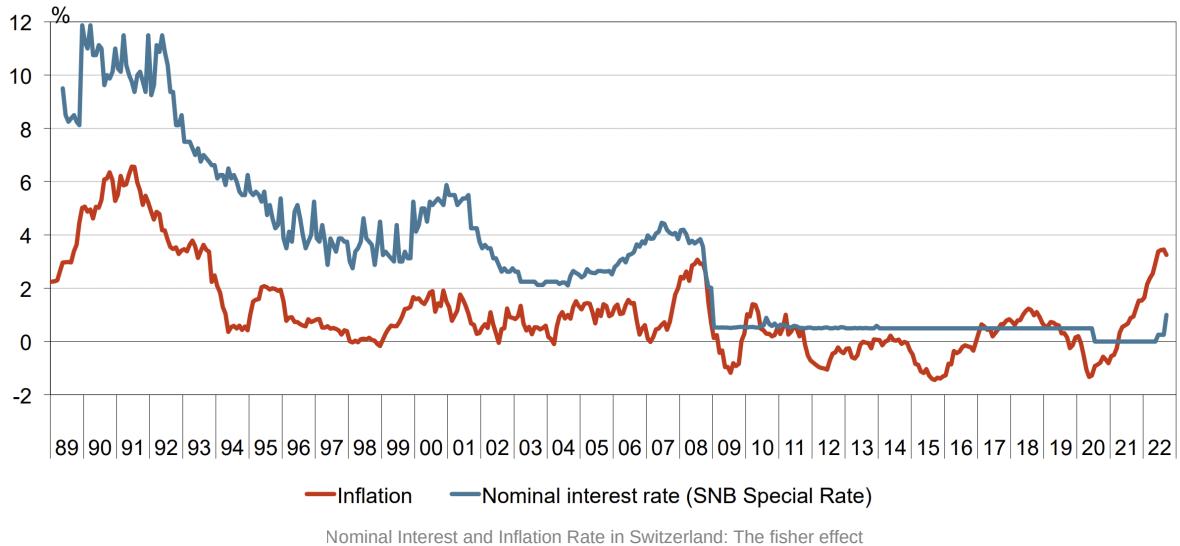
7.5 Inflation Tax & the Fisher Effect

Inflation tax: the revenue the government raises by creating money

When the government raises revenue by printing money, it is said to levy an inflation tax. An inflation tax is like a tax on everyone who holds money. The inflation ends when the government institutes fiscal reforms such as cuts in government spending.

Fisher effect: the one-for-one adjustments of the nominal interest rate to the inflation rate

According to the Fisher effect, when the rate of inflation rises, the nominal interest rate rises by the same amount. The real interest rate stays the same (It is determined on the loanable funds market).

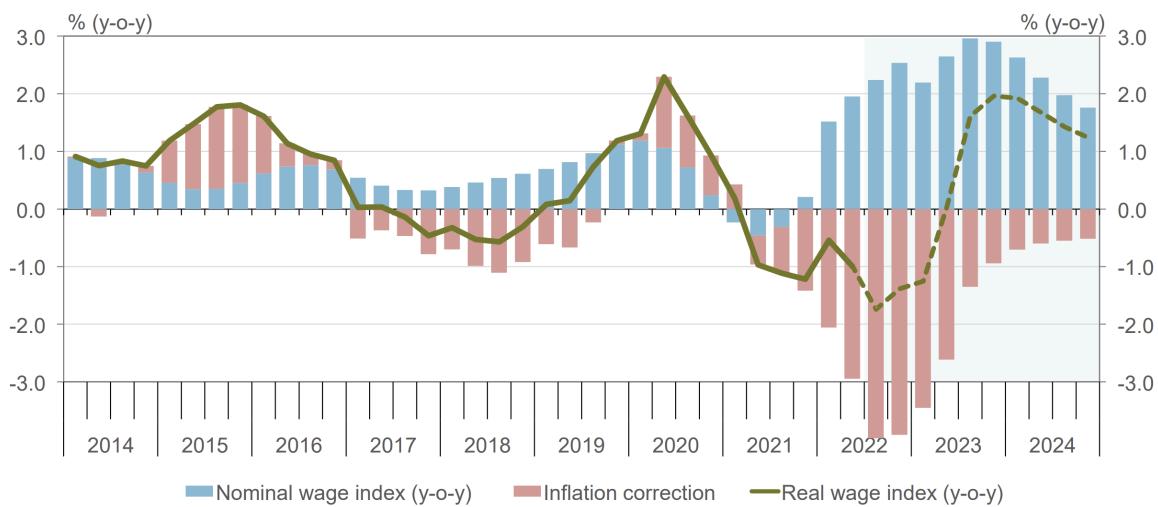


7.6 The costs of Inflation

Inflation does not in itself reduce people's real purchasing power. As prices rise, so do incomes. Inflation does not in itself reduce the purchasing power of incomes. However, not everyone's income rises exactly with inflation.

Common misperception: inflation reduces real wages. This is true only in the short run, when nominal wages are fixed by contracts. In the long run, real wages are determined by labour supply and the marginal product of labour, not the price level or the inflation rate.

▼ Wage Development in Switzerland



7.6.1 Shoelleather Costs

Shoelleather costs are the resources wasted when inflation encourages people to reduce their money holdings. Inflation reduces the real value of money, so people have an incentive to minimize their cash holdings. Less cash requires more frequent trips to the bank to withdraw money from interest-bearing accounts. The actual cost of reducing your money holdings is the time and convenience you must sacrifice to keep less money on hand. Also, extra trips to the bank take time away from productive activities.

7.6.2 Menu costs

Menu costs are the costs of adjusting prices. During inflationary times, it is necessary to update price lists and other posted prices. This is a resource-consuming process that takes away from other productive activities.

7.6.3 Relative-Price Variability and the Misallocation of Resources

Inflation distorts relative prices. If prices of some goods are “sticky” (e.g. because of menu costs) relative to other goods, then inflation is creating changes in relative prices that lead to decisions of market participants that are economically inefficient in the sense that it deviates from the optimal allocation of resources. Hence, markets are less able to allocate resources to their best use.

7.6.4 Inflation-Induced Tax Distortion

Inflation exaggerates the size of capital gains and increases the tax burden on this type of income. With progressive taxation, capital gains are taxed more heavily. The income tax treats the nominal interest earned on savings as income, even though part of the nominal interest rate merely compensates for inflation. The after-tax real interest rate falls, making saving less attractive.

7.6.5 Confusion and Inconvenience

When the Central Bank increases the money supply and creates inflation, it erodes the real value of the unit of account. Inflation causes dollars at different times to have different real values. Therefore, with rising prices, it is more difficult to compare real revenues, costs, and profits over time.

7.6.6 Arbitrary Redistribution of Wealth

Unexpected inflation redistributes wealth among the population in a way that has nothing to do with either merit or need. These redistributions occur because many loans in the economy are specified in terms of the unit of account—money.

7.7 Deflation

Deflation: a fall in the price level over a period occurring when the inflation rate is less than 0 per cent

Deflation can be as damaging as inflation because:

- There is little incentive to spend today if the expectation is for cheaper prices tomorrow
- It might result in consumers not spending at levels that provide incentives for firms to invest in new capacity
- little or no growth and with that....
- increased likelihood of unemployment

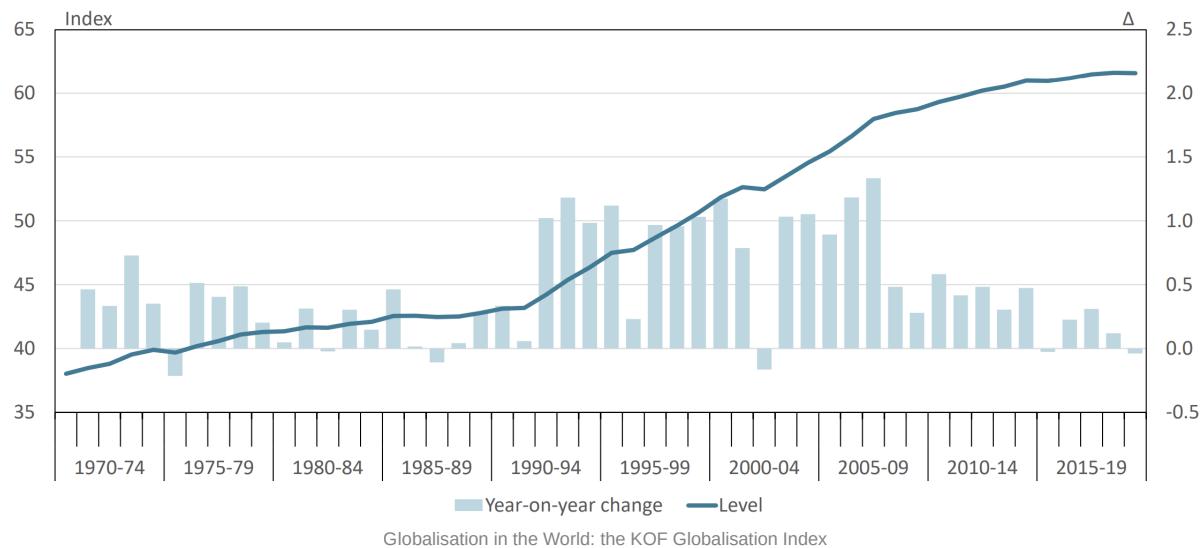
▼ 7.8 Summary of the Chapter

- The overall level of prices in an economy adjusts to bring money supply and money demand into balance.
- The overall level of prices in an economy adjusts to bring money supply and money demand into balance.
- Persistent growth in the quantity of money supplied leads to continuing inflation.
- The principle of money neutrality asserts that changes in the quantity of money influence nominal variables but not real variables.
- A government can pay for its spending simply by printing more money.
- This can result in an “inflation tax” and hyperinflation.
- According to the Fisher effect, when the inflation rate rises, the nominal interest rate rises by the same amount, and the real interest rate stays the same.
- Many people think that inflation makes them poorer because it raises the cost of what they buy.
- This view is a fallacy because inflation also raises nominal incomes.
- Economists have identified six costs of inflation:
 1. Shoeleather costs
 2. Menu costs
 3. Increased variability of relative prices
 4. Unintended tax liability changes

5. Confusion and inconvenience
6. Arbitrary redistributions of wealth

8. International Trade

Chapter 3, 5 and 17



8.1 Welfare Economics

Welfare economics is the study of how the allocation of resources affects economic well-being

Buyers and sellers receive benefits from taking part in the market. Equilibrium in the market results in maximum benefits, and therefore maximum total welfare for both the consumers and the producers of the product.

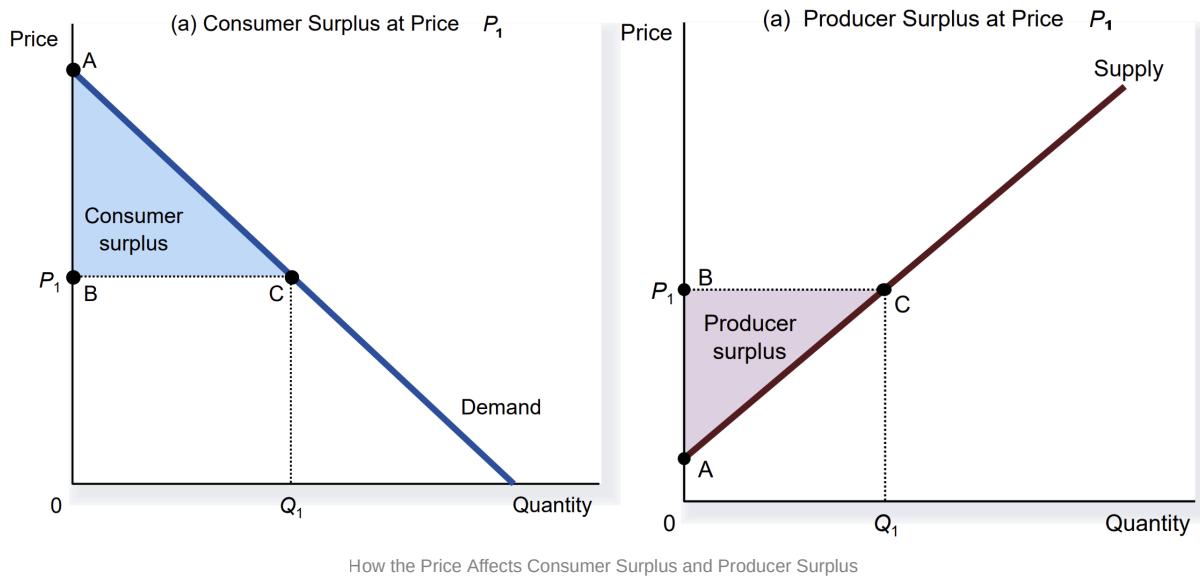
Surplus is a situation in which the quantity supplied is greater than the quantity demanded at the going prices or vice versa.

Consumer surplus measures economic welfare from the buyer's side

- Willingness to pay is the maximum amount that a buyer will pay for a good
- It measures how much the buyer values the good or service
- Consumer surplus is the buyer's willingness to pay for a good minus the amount the buyer actually pays for it, which is the area below the demand curve and above the price

Producer surplus measures economic welfare from the seller's side

- Producer surplus is the amount a seller is paid for a good minus the seller's cost
- It measures the benefit to sellers participating in a market and equals the area below the price and above the supply curve



Consumer and producer surplus may be used to address the following question: Is the allocation of resources determined by free markets in any way desirable?

$$\text{Consumer surplus} = \text{Value to buyers} - \text{Amount paid by buyers}$$

$$\text{Producer surplus} = \text{Amount received by sellers} - \text{Cost to sellers}$$

$$\begin{aligned}\text{Total surplus} &= \text{Consumer surplus} + \text{Producer surplus} \\ &= \text{Value to buyers} - \text{Cost to seller}\end{aligned}$$

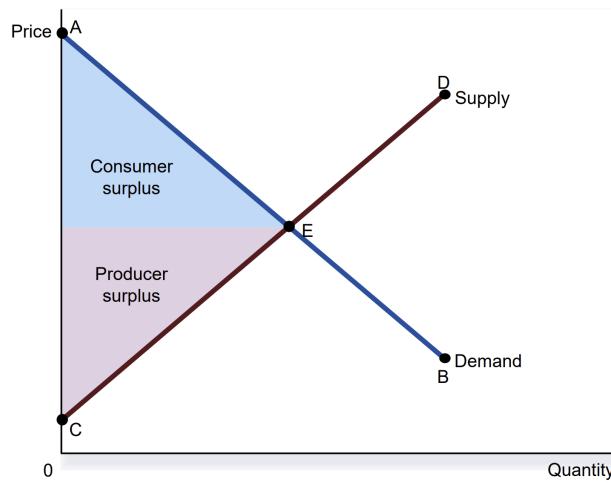
8.2 Market Efficiency

Efficiency is the property of a resource allocation of maximizing the total surplus received by all members of society

An allocation is **Pareto efficient** if no individual can be made better off without another being made worse off

In the equilibrium of a competitive market:

- the sum of consumer surplus and producer surplus is maximized
- consumer surplus cannot be raised without lowering producer surplus



Three Insights Concerning Market Outcomes:

1. Free markets allocate the supply of goods to the buyers who value them most highly, as measured by their willingness to pay
2. Free markets allocate the demand for goods to the sellers who can produce them at least cost
3. Free markets produce the quantity of goods that maximizes the sum of consumer and producer surplus

How do we satisfy our wants and needs in a global economy? What determines whether a country imports or exports a good? Who gains and who loses from free trade among countries?

8.3 International Trade: An Example

Imagine: Only two goods in an economy: potatoes and meat. Only two people: a market gardener and a cattle farmer. What should each produce? Why should they trade?

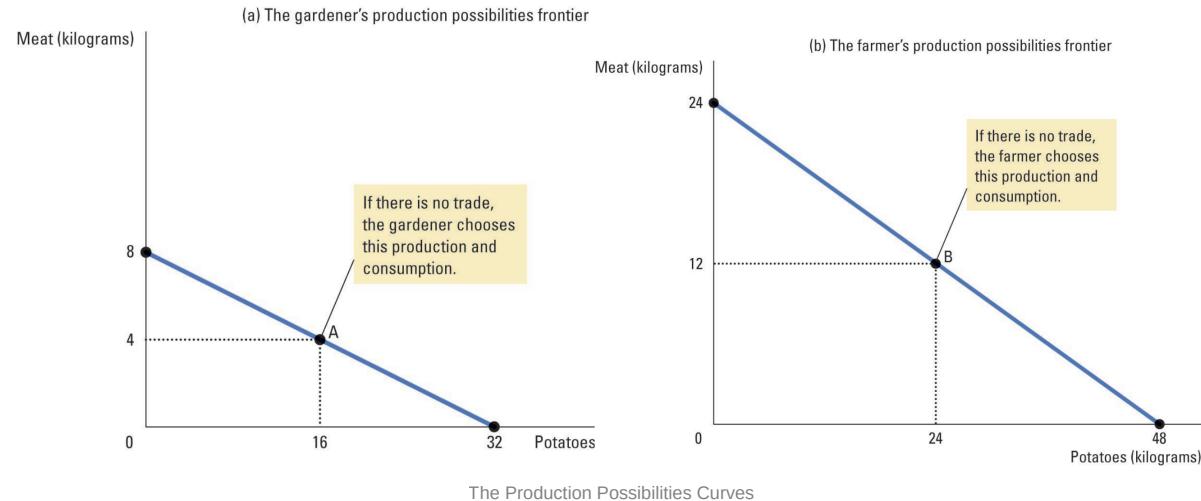
Time needed to make 1 kg of:		Amount of meat or potatoes produced in 48 hours	
	Meat	Potatoes	Meat
Gardener	6 hrs/kg	1.5 hrs/kg	8 kg
Farmer	2 hrs/kg	1 hr/kg	24 kg

Obvious gains if: The market gardener can only grow potatoes and the farmer can only raise beef cattle. The market gardener can raise cattle as well as grow potatoes, but he is not as good at it; the farmer can grow potatoes in addition to raising cattle, but her land is not well suited for it.

Each faces different opportunity costs

Potion of Self-Sufficiency: By ignoring each other:

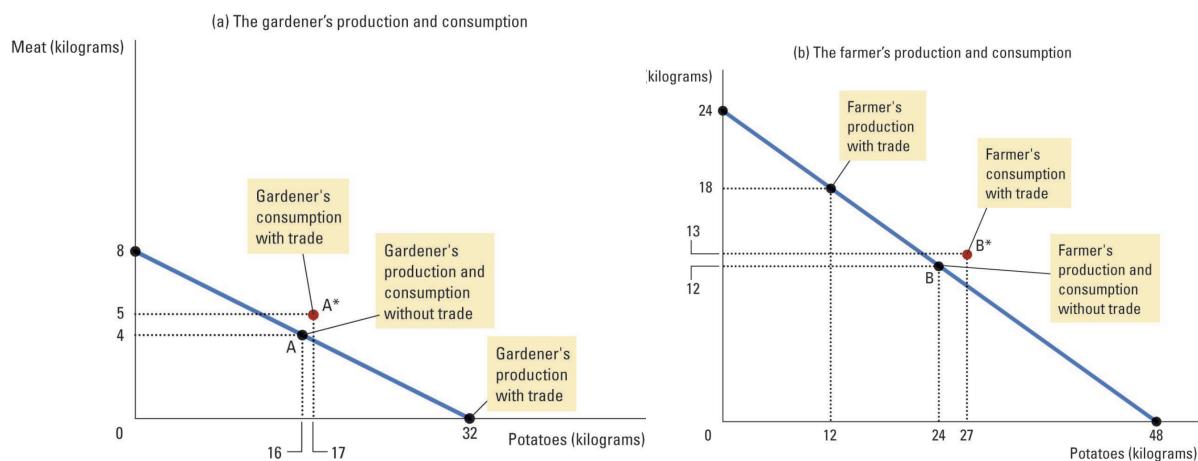
- Each consumes what they each produce
- The production possibilities frontier is also the consumption possibilities frontier
- Without trade, economic gains are diminished



The gardener and the farmer decide to specialize and trade. Each would be better off if they specialized in producing the product they are more suited to produce, and then trade with each other.

	Gardener	Farmer		
	Meat	Potatoes	Meat	Potatoes
Without trade:				
Production and consumption	4 kg	16 kg	12 kg	24 kg
With trade:				
Production	0 kg	32 kg	18 kg	12 kg
Trade	Gets 5 kg	Gives 15 kg	Gives 5 kg	Gets 15 kg
Consumption	5 kg	17 kg	13 kg	27 kg
Gains from trade:				
Increase in consumption	+1 kg	+1 kg	+1 kg	+3 kg

Specialization and Trade



8.4 The Principle Of Comparative Advantage

Differences in the costs of production determine the following: Who should produce what? How much should be traded for each product?

Two ways to measure differences in costs of production:

1. The number of hours required to produce a unit of output (for example, one pound of potatoes (Reciprocal of productivity))
2. The opportunity cost of sacrificing one good for another

8.4.1 Absolute Advantage

The comparison among producers of a good according to their productivity is the absolute advantage.

It describes the productivity of one person, firm, or nation compared to that of another. The producer that requires a smaller quantity of inputs to produce a good is said to have an absolute advantage in producing that good.

Absolute Advantage: exists where a producer can produce a good using fewer factor inputs than other

In our example: The farmer needs only 1 hour to produce a kilogram of potatoes, whereas the gardener needs 1.5 hours. The farmer needs only 2 hours to produce a kilogram of meat, whereas the gardener needs 6 hours. The farmer has an absolute advantage in the production of both meat and potatoes.

8.4.2 Comparative Advantage

Compares producers of a good according to their opportunity cost. Whatever must be given up to obtain some item. The producer who has the smaller opportunity cost of producing a good is said to have a comparative advantage in producing that

good.

Comparative Advantage: the comparison among producers of a good according to their opportunity cost. A producer is said to have a comparative advantage in the production of a good if the opportunity cost is lower than that of another producer.

In our example: The farmer's opportunity cost of a kilo of potatoes is $\frac{1}{2}$ of a kilo of meat, whereas the gardener's opportunity cost of a kilo of potatoes is $\frac{1}{4}$ a kilo of meat. The farmer's opportunity cost of a kilo of meat is only 2 kilos of potatoes, while the gardener's opportunity cost of a kilo of meat is 4 kilos of potatoes so, the farmer has a comparative advantage in the production of meat, but the gardener has a comparative advantage in the production of potatoes.

8.4.3 Comparative Advantage and Trade

Comparative advantage and differences in opportunity costs are the basis for specialized production and trade. Trade can benefit everyone in a society because it allows people to specialize in activities in which they have a comparative advantage.

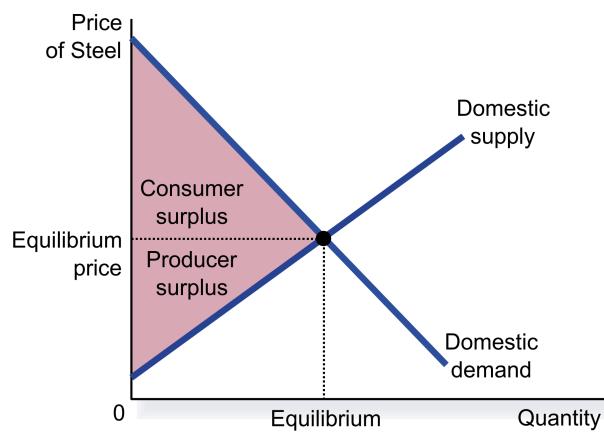
Whenever potential trading parties have differences in opportunity costs, they can each benefit from trade \Rightarrow Everybody produces only the goods in which they have a comparative advantage

8.5 The Determinants of Trade

8.5.1 Equilibrium Without Trade

Assume a country is isolated from the rest of the world and produces steel. The market for steel consists of the buyers and sellers in the country. No one in the country is allowed to import or export steel.

This results in: The domestic price adjusts to balance demand and supply and the sum of consumer and producer surplus measures the total benefits that buyers and sellers receive.



The Equilibrium without International Trade

8.5.2 The World Price and Comparative Advantage

The effects of free trade can be shown by comparing the domestic price of a good without trade and the world price of the good.

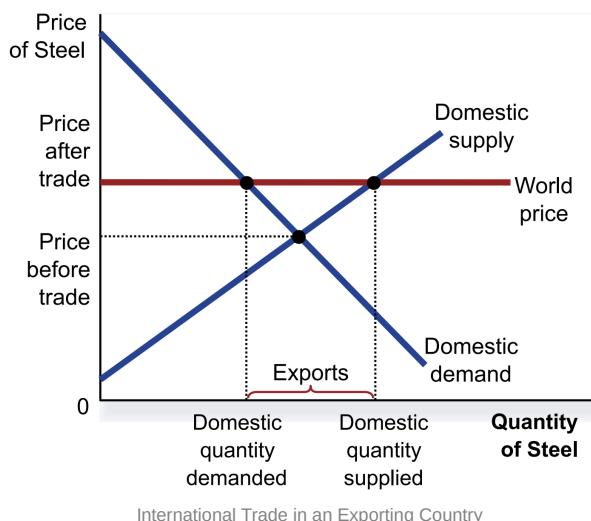
World price: the price of a good that prevails in the world market for that good. It reflects the value of the good relative to all other goods in the world market.

Country has comparative advantage \Rightarrow domestic price below the world price \Rightarrow Country will be an exporter of the good

Country doesn't have comparative advantage \Rightarrow domestic price higher than the world price \Rightarrow Country will be an importer of the good

8.5.3 The Gains and Losses of an Exporting Country

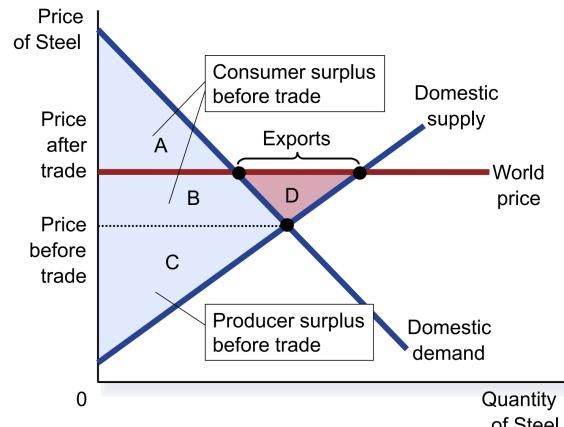
With the domestic price now equal to the world price, the domestic quantity supplied is greater than the domestic quantity demanded \Rightarrow The country exports.



When the domestic price rises to equal the world price, sellers are better off (producer surplus rises from C to $B + C + D$), and buyers are worse off (consumer surplus falls from $A + B$ to A). Total surplus rises by an amount equal to area D , indicating that trade raises the economic well-being of the country as a whole.

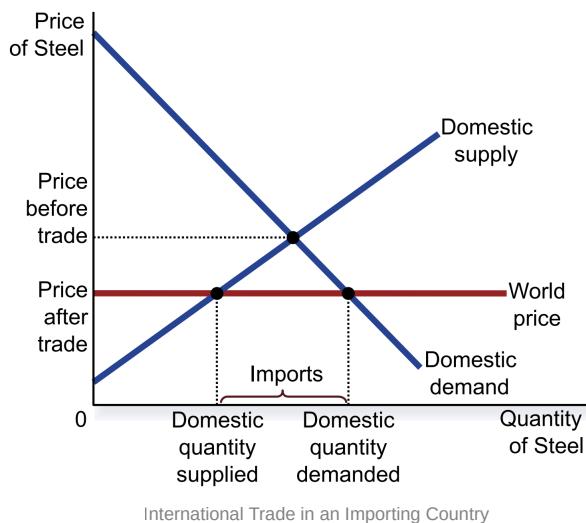
	Before Trade	After Trade	Change
Consumer Surplus	$A + B$	A	$-B$
Producer Surplus	C	$B + C + D$	$+(B + D)$
Total Surplus	$A + B + C$	$A + B + C + D$	$+D$

The area D shows the increase in total surplus and represents the gains from trade.



8.5.4 The Gains and Losses of an Importing Country

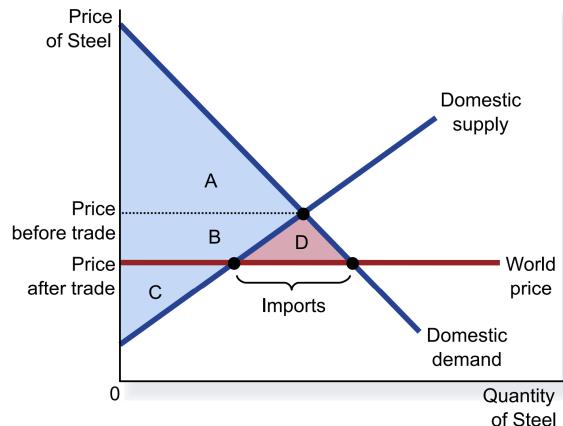
International Trade in an Importing Country: If the world price of steel is lower than the domestic price, the country will be an importer of steel when trade is permitted. Domestic consumers will want to buy steel at the lower world price. Domestic producers of steel will have to lower their output because the domestic price moves to the world price.



When the domestic price falls to equal the world price, buyers are better off (consumer surplus rises from A to $A + B + D$), and sellers are worse off (producer surplus falls from $B + C$ to C). Total surplus rises by an amount equal to area D , indicating that trade raises the economic well-being of the country as a whole. So the gains of the winners exceed the losses of the losers.

	Before Trade	After Trade	Change
Consumer Surplus	A	$A + B + D$	$+(B + D)$
Producer Surplus	$B + C$	C	$-B$
Total Surplus	$A + B + C$	$A + B + C + D$	$+D$

The area D shows the increase in total surplus and represents the gains from trade.

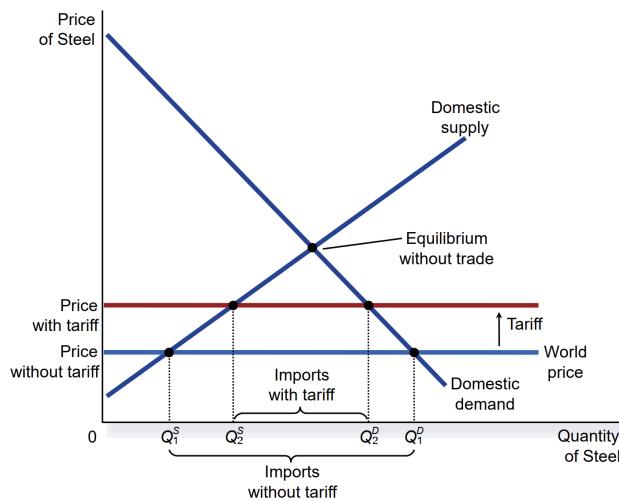


8.6 Restrictions On Trade

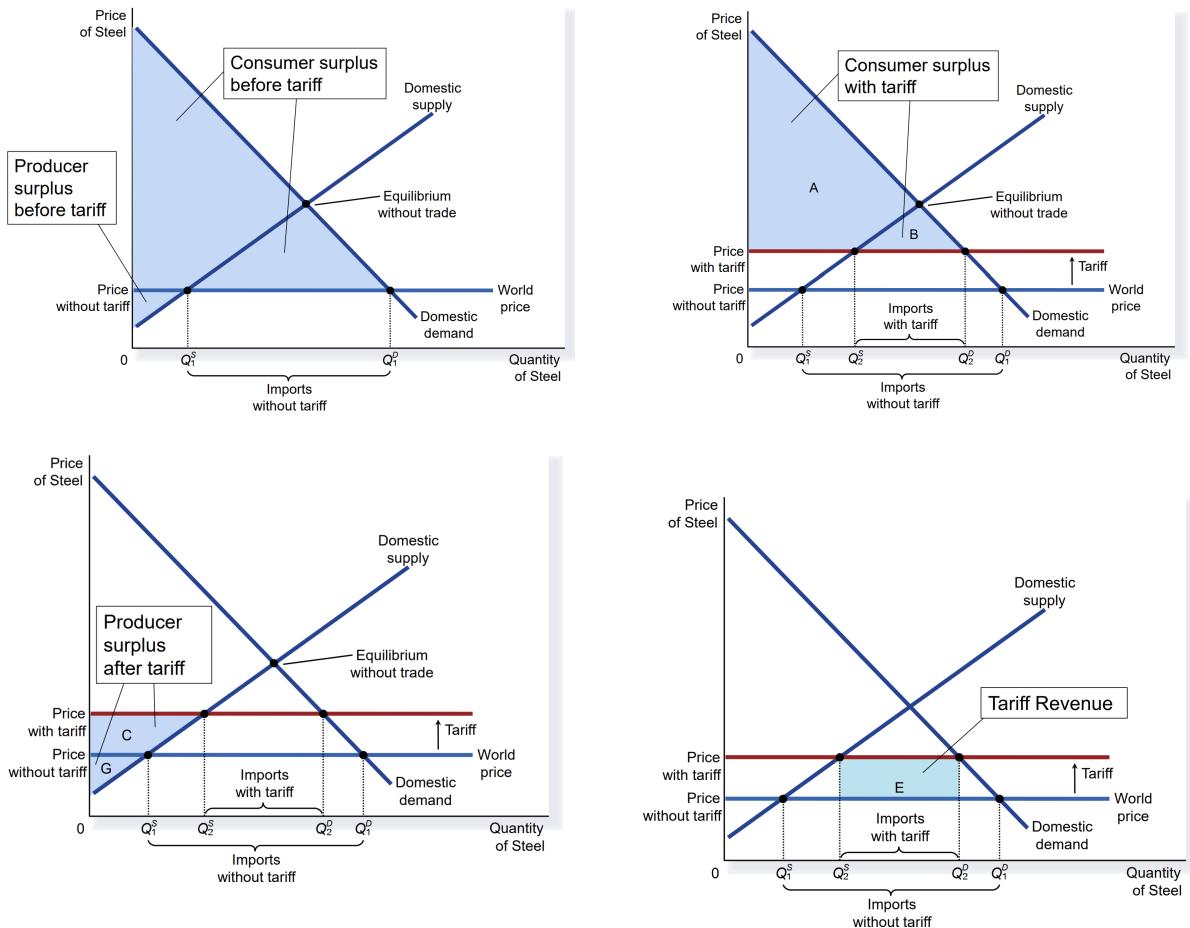
Restrictions on trade come in the form of: Tariffs, Quotas and Non-tariff barriers

8.6.1 The effects of a Tariff

A **tariff** is a tax on goods produced abroad and sold domestically.

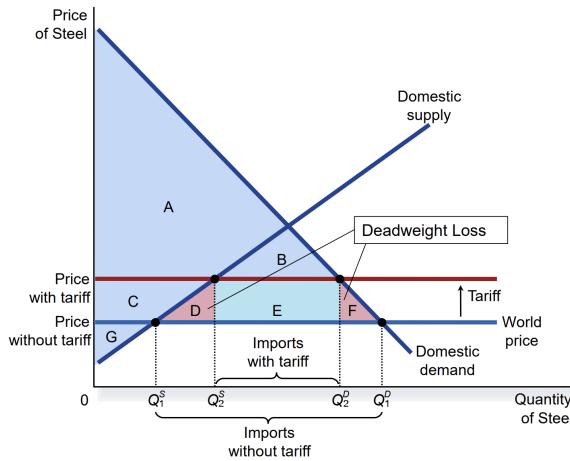


Tariffs raise the price of imported goods above the world price by the amount of the tariff.



	Before Tariff	After Tariff	Change
Consumer Surplus	$A + B + C + D + E + F$	$A + B$	$-(C + D + E + F)$
Producer Surplus	G	$C + G$	$+C$
Government Revenue	None	E	$+E$
Total Surplus	$A + B + C + D + E + F + G$	$A + B + C + E + G$	$-(D + F)$

The area $D + F$ shows the fall in total surplus and represents the deadweight loss of the tariff.

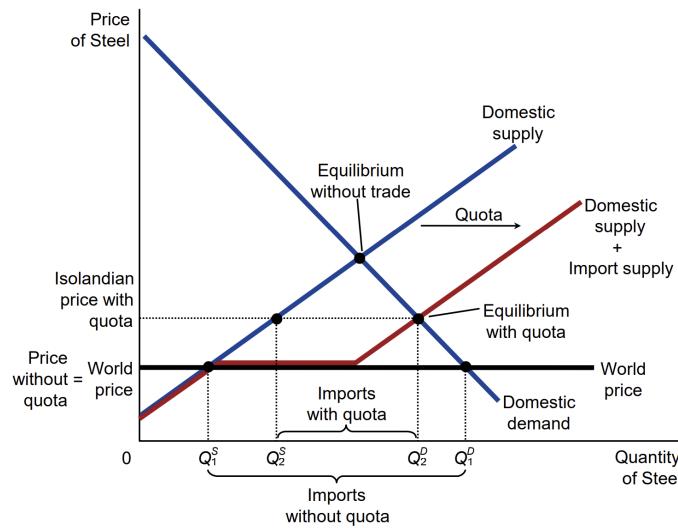


A tariff reduces the quantity of imports and moves a market closer to the equilibrium that would exist without trade. Total surplus falls by an amount equal to area $D + F$. These two triangles represent the deadweight loss from the tariff.

A tariff reduces the quantity of imports and moves the domestic market closer to its equilibrium without trade. With a tariff, total surplus in the market decreases by an amount referred to as a deadweight loss.

8.6.2 The Effects of an Import Quota

An **import quota** is a limit on the quantity of a good (for example a limited number of import licences) that can be produced abroad and sold domestically



The Effects of an Import Quota

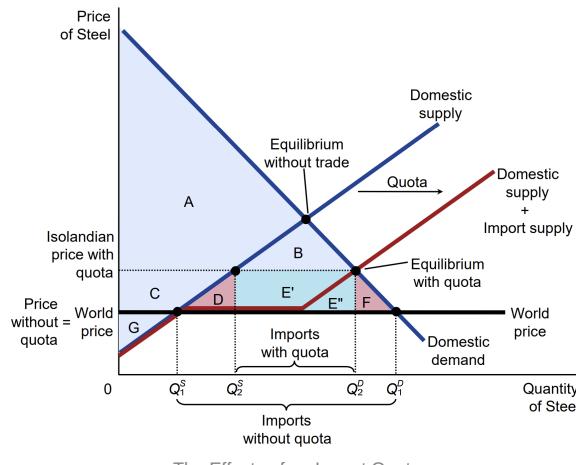
Because the quota raises the domestic price above the world price, domestic buyers of the good are worse off, and domestic sellers of the good are better off. License holders are better off because they make a profit from buying at the world price and selling at the higher domestic price.

With a **quota**, total surplus in the market decreases by an amount referred to as a deadweight loss

	Before Quota	After Quota	Change
Consumer Surplus	$A + B + C + D + E' + E'' + F$	$A + B$	$-(C + D + E' + E'' + F)$
Producer Surplus	G	$C + G$	$+C$
License-Holder Surplus	None	$E' + E''$	$+(E' + E'')$
Total Surplus	$A + B + C + D + E' + E'' + F + G$	$A + B + C + E' + E'' + G$	$-(D + F)$

The area $D + F$ shows the fall in total surplus and represents the deadweight loss of the quota.

An import quota, like a tariff, reduces the quantity of imports and moves a market closer to the equilibrium that would exist



without trade. Total surplus falls by an amount equal to area $D + F$. These two triangles represent the deadweight loss from the quota. In addition, the import quota transfers $E' + E$ to whoever holds the import licences.

8.6.3 The Lessons for Trade Policy

If government sells import licences for full value, revenue equals that of an equivalent tariff and the results of tariffs and quotas are identical.

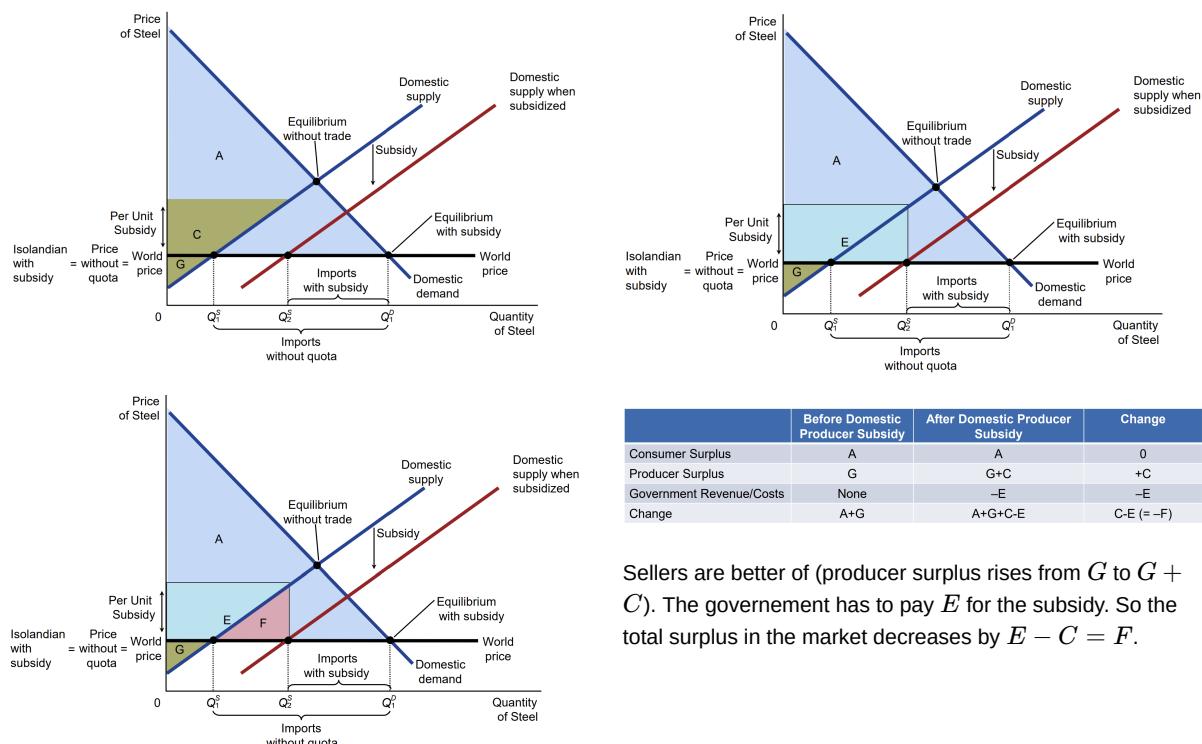
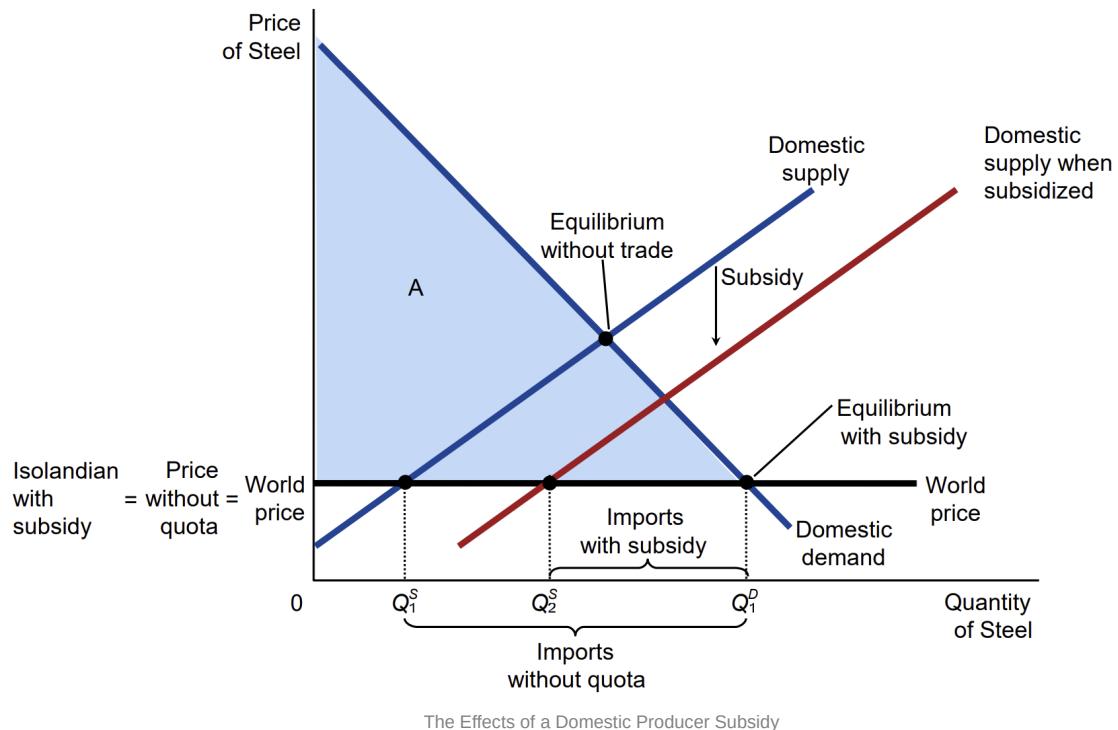
Both tariffs and import quotas:

- ⇒ raise domestic prices
- ⇒ reduce the welfare of domestic consumers
- ⇒ increase the welfare of domestic producers
- ⇒ cause deadweight losses

8.6.4 The Effects of a Domestic Producer Subsidy

A subsidy is a benefit given to an individual, business, or institution, usually by the government. It can be direct (such as cash payments) or indirect (such as tax breaks). The subsidy is typically given to remove some type of burden, and it is often considered to be in the overall interest of the public, given to promote a social good or an economic policy.

A **subsidy** (*Deutsch: Subvention*) is a direct or indirect payment to individuals or firms, usually in the form of a cash payment from the government or a targeted tax cut.



A producer subsidy reduces the quantity of imports, while keeping the domestic price equal to the world price. With such a subsidy, total surplus in the market decreases by an amount referred to as a deadweight loss.

8.6.5 Non-Tariff Barriers

Barriers to trade are sometimes not obvious, but nevertheless present significant restrictions on the ability of firms to buy and sell goods from and to other countries. We will briefly outline some of the main ones:

- **Complex or discriminatory rules of origin and quality conditions:** Country may impose strict rules on the production of goods (mostly of technical and health and safety issues)
⇒ exporters may find it difficult to meet these rules
- **Sanitary and phytosanitary measures:** Measures to protect humans, animals, and plants from diseases, pests, or contaminants, like food safety standards.
⇒ exporters may find it difficult to meet these rules or it is too expensive
- **Administrative regulations:** Some countries might set up administrative procedures (Red tape) that must be met before importing any good
⇒ exporters may find it difficult to meet these rules or it is too expensive
- **Currency manipulation:** Some countries might implement measures to artificially influence the value of their currency, leading to exports facing a higher price than would otherwise be the case, which reduces their competitiveness against domestic producers.

8.6.6 The Arguments for Restricting Trade

- **Jobs argument:** trade with other countries could destroy domestic jobs
- **National Security argument:** Free trade would allow a country to become dependent on foreign countries
- **Infant Industry argument:** New industries sometimes argue for temporary trade restrictions to help them get started
- **Unfair Competition argument:** Free trade could be desirable only if all countries play the same rules (firms in different countries are affected by different laws and regulations)
- **Protection as a Bargaining Chip**

▼ 8.7 Summary of the Chapter

- The effects of free trade can be determined by comparing the domestic price without trade to the world price
 - A low domestic price indicates that the country has a comparative advantage in producing the good; the country will become an exporter
 - A high domestic price indicates that other countries have a comparative advantage in producing the good; the country will become an importer
- When a country allows trade and becomes an exporter of a good, producers of the good are better off, and consumers of the good are worse off
- When a country allows trade and becomes an importer of a good, consumers of the good are better off, and producers are worse off
- There are various arguments for restricting trade:
 - protecting jobs, defending national security, helping infant industries, preventing unfair competition, responding to foreign trade restrictions
- Economists believe that free trade is in the long run the better policy

9. Open-Economy Macroeconomics

9.1 Basic Concepts

Open and Closed Economies: A closed economy is one that does not interact with other economies in the world. There are no exports, no imports, and no capital flows. An open economy is one that interacts freely with other economies around the world.

An open economy interacts with other countries in two ways.

1. It buys and sells goods and services in world product markets
2. It buys and sells capital assets in world financial markets

The Flow of Goods: Exports, Imports, and Net Exports. Switzerland is a small and relatively open economy. It imports and exports huge quantities of goods and services. Over the past four decades, international trade and finance have become increasingly important.

9.2 The International Flows of Goods and Capital

An open economy interacts with other economies in two ways: it buys and sells goods and services in world product markets, and it buys and sells capital assets such as stocks and bonds in word financial markets.

9.2.1 The Flow of Goods: Exports, Imports, Net Exports

Exports are goods and services that are produced domestically and sold abroad

Imports are goods and services that are produced abroad and sold domestically

Net exports (NX) are the value of a nation's exports minus the value of its imports.

$$\text{Net Exports} = \text{Exports} - \text{Imports}$$

Net exports are also called the trade balance.

A trade (balance) deficit is a situation in which net exports (NX) are negative.

A trade (balance) surplus is a situation in which net exports (NX) are positive.

Balanced trade refers to when net exports are zero.

Trade (balance) deficit: $\text{Imports} > \text{Exports}$

Trade (balance) surplus: $\text{Exports} > \text{Imports}$

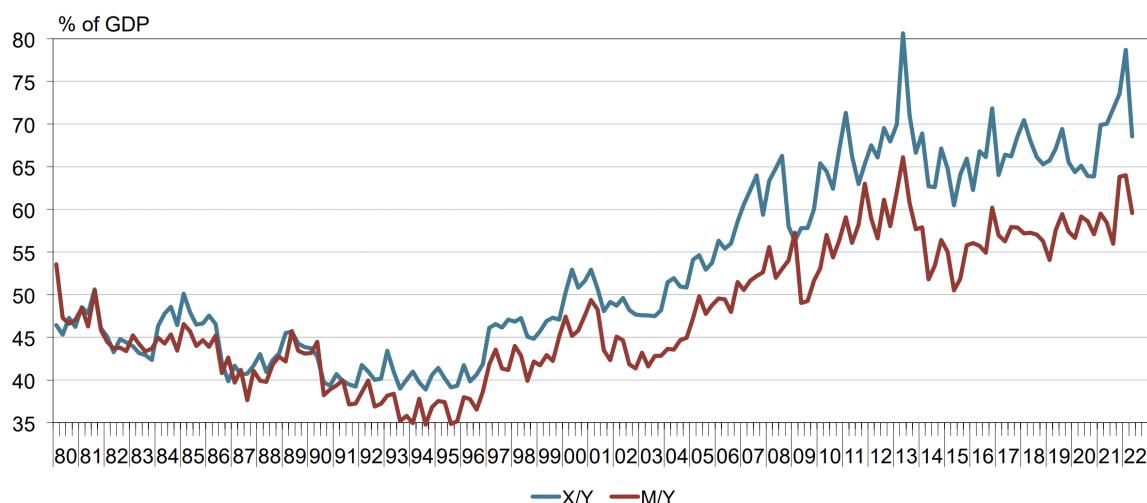
Balanced trade: $\text{Exports} = \text{Imports}$

Factors That Affect Net Exports:

- The tastes of consumers for domestic and foreign goods
- The prices of goods at home and abroad
- The exchange rates at which people can use domestic currency to buy foreign currencies
- The incomes of consumers at home and abroad
- The costs of transporting goods from country to country
- The policies of the government toward international trade

As these variables change over time, so does the amount of international trade.

▼ The Internationalization of the Swiss Economy: Exports Vs. Imports



9.2.2 The Flow of Financial Resources: Net Capital Outflow

A UK resident with 20'000£ for example could use this money to buy a BMW in the goods market, but could use instead the money to buy a stock in the BMW corporation. The first transaction would represent a flow of goods, whereas the second would represent a flow of capital.

Net Capital Outflow (NCO): refers to the purchase of foreign assets by domestic residents minus the purchase of domestic assets by foreigners

Net capital outflow = Purchase of foreign assets by domestic residents – Purchase of domestic assets by foreigners

Example: A Swiss resident buys stock in the Cadbury's corporation and an American buys stock in Nestlé. When a Swiss resident buys stock in a British bank, the purchase raises Swiss net capital outflow. When an American resident buys a bond issued by the Swiss government, the purchase reduces Swiss net capital outflow.

Variables that Influence Net Capital Outflow:

- The real interest rates being paid on foreign assets
- The real interest rates being paid on domestic assets
- The exchange rate at which people can use domestic currency to buy foreign currencies
- The perceived economic and political risks of holding assets abroad
- The government policies that affect foreign ownership of domestic assets

9.2.3 The Equality of Net Exports and Net Capital Outflow

The equality of net exports and net capital outflow follows from the fact that every international transaction is an exchange. When a seller country transfers a good or service to a buyer country, the buyer country gives up some asset to pay for this good or service. The value of asset equals the value of the good or service sold. When we add everything up, the net value of goods and services sold by a country (NX) must equal the net value of assets acquired (NCO).

For an economy as a whole, NX and NCO must balance each other so that:

$$\underbrace{NCO}_{\text{Net Capital Outflow}} = \underbrace{NX}_{\text{Net exports}}$$

This holds true because every transaction that affects one side must also affect the other side by the same amount.

Net exports is a component of GDP:

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

National saving is the income of the nation that is left after paying for current consumption and government purchases:

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

National saving (S) equals $Y - C - G$ so:

$$\begin{aligned} S &= I + NX \\ S - I &= NX \\ S - I &= \text{Net Capital Outflow} = NCO = NX \end{aligned}$$

So it follows that $S = I + NCO$. In other words, if Swiss citizens, for example, save 1CHF of their income for the future, that one CHF can be used to finance accumulation of domestic capital or it can be used to finance the purchase of capital abroad.

9.2.4 The Balance of Payments (BoP) Accounts

Balance of payments: the official account of international payments for the import and export of goods, services and capital

The BoP consists of the current account (\approx trade account) and the financial (and capital) account.

Example of Paired Transactions: A Swiss firm buys a machine for CHF 1000 from a Danish firm. The Swiss firm transfers CHF 1000 to the Danish firm's bank account in Zurich. This transaction creates the following two offsetting entries in the Swiss balance of payments:

It enters the Swiss current account (NX) with a negative sign $\Delta NX = -CHF1000$

It shows up as a credit in the Swiss financial account $\Delta NCO = -CHF1000$

That is, Switzerland gets goods in return for assets.

9.2.5 International Flows of Goods and Capital: Summary

Trade deficit

Exports < Imports

Net exports < 0

$Y < C + I + G$

Saving < Investment

Net capital outflow < 0

Balanced Trade

Exports = Imports

Net exports $= 0$

$Y = C + I + G$

Saving = Investment

Net capital outflow $= 0$

Trade surplus

Exports > Imports

Net exports > 0

$Y > C + I + G$

Saving > Investment

Net capital outflow > 0

9.3 The Prices for International Transactions: Real and Nominal Exchange Rates

Different countries use different currencies. In trading internationally, firms will need to acquire these different currencies to complete transactions. This creates a demand and supply of currencies traded on foreign exchange markets.

9.3.1 Nominal Exchange rate

International transactions are influenced by international prices. The two most important international prices are the nominal exchange rate and the real exchange rate.

The **nominal exchange** rate is the rate at which a person can trade the currency of one country for the currency of another.

Can be expressed in two ways:

- In units of foreign currency per one Swiss Franc

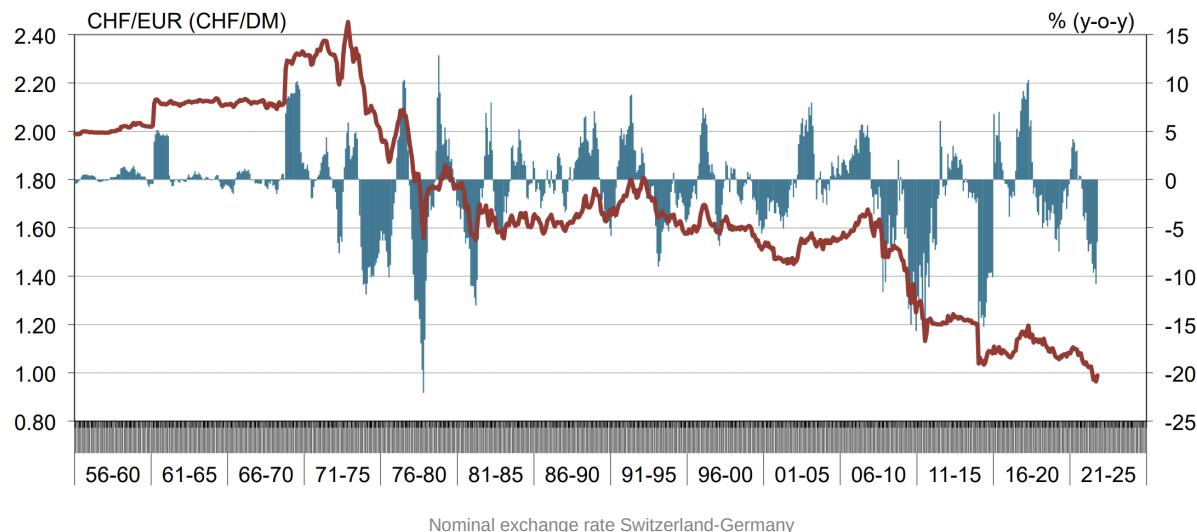
- And in units of Swiss Francs per one unit of the foreign currency

Assume the exchange rate between the Japanese yen and U.S. dollar is 80 yen to one dollar. One U.S. dollar trades for 80 yen, or one yen trades for 1/80 (= 0.0125) of a dollar.

Appreciation refers to an increase in the value of a currency as measured by the amount of foreign currency it can buy
(Deutsch: Wertsteigerung, Aufwertung)

Depreciation refers to a decrease in the value of a currency as measured by the amount of foreign currency it can buy
(Deutsch: Entwertung)

If a Swiss Franc buys more foreign currency, there is an appreciation of the Swiss Franc. If it buys less there is a depreciation of the Swiss Franc.



9.3.2 Real Exchange Rate

The **real exchange rate** is the rate at which a person can trade the goods and services of one country for the goods and services of another.

The real exchange rate compares the prices of domestic goods and foreign goods in the domestic economy.

For example: If a case of Swiss beer is twice as expensive as German beer, the real exchange rate is 2 cases of German beer per case of Swiss beer.

The real exchange rate depends on the nominal exchange rate (foreign currency (fc) or local currency (lc)) and the prices of goods in the two countries measured in local currencies.

The real exchange rate is a key determinant of how much a country exports and imports:

$$\text{Real Exchange Rate} = \frac{\text{Nominal exchange rate}}{\text{Foreign price}} \cdot \frac{\text{Domestic price}}{\text{Foreign price}}$$

Assume: A depreciation in the Swiss real exchange rate:

- ⇒ A depreciation (fall) in the Swiss real exchange rate means that Swiss goods have become cheaper relative to foreign goods.
- ⇒ This encourages consumers both at home and abroad to buy more Swiss goods and fewer goods from other countries.
- ⇒ Swiss exports rise, and Swiss imports fall, and both of these changes raise Swiss net exports.
- ⇒ Conversely, an appreciation in the Swiss real exchange rate means that Swiss goods have become more expensive compared to foreign goods, so Swiss net exports fall.

9.3.3 The Big-Mac-Index

one good: Big Mac

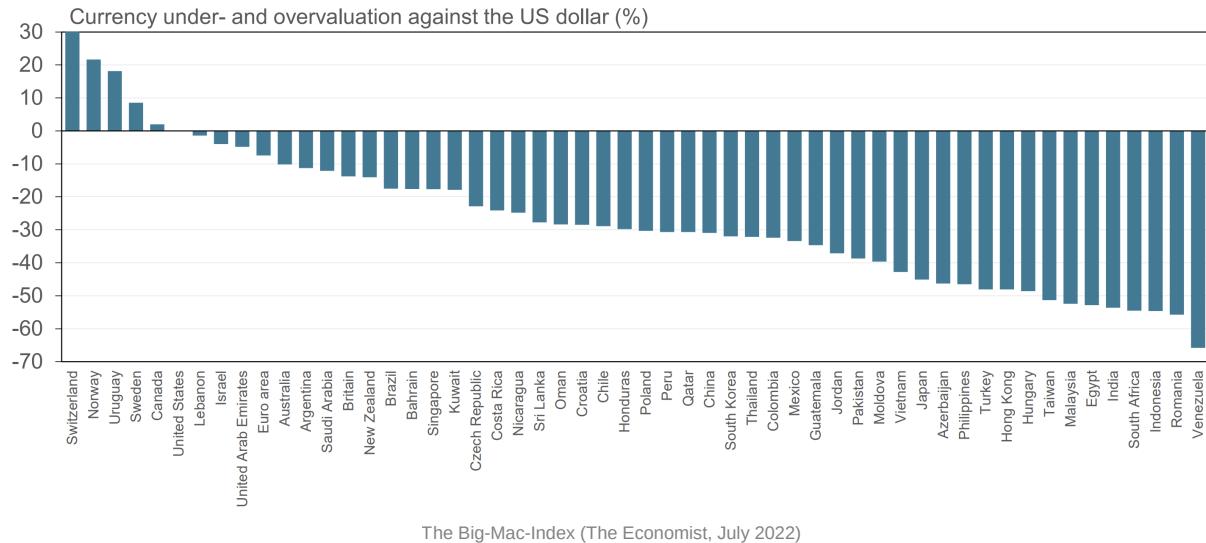
price in the United States $P^* = \$5.00$

price in Switzerland: $P = CHF 6.50$

nominal exchange rate: $e = 1.15 \frac{\$}{CHF}$

Real exchange rate: $\varepsilon = \frac{1.15 * 6.50}{5.00} = 1.495$

To buy a Swiss Big Mac, someone from the US would have to pay an amount that could buy 1.5 Big Macs in the US.



The Big-Mac-Index (The Economist, July 2022)

In America, a McDonald's Big Mac costs \$5.71. In China, the same burger costs just 21.7 Yuan, equivalent to \$3.10 at market exchange rates. Since 21.7 Yuan can buy as much burger as \$5.71, a Yuan should be worth \$0.26. In fact, it costs \$0.14, suggesting that it is undervalued by about 45%. The euro was undervalued by 16% relative to the US dollar. The Swiss franc is the most expensive currency (for buying a big mac). It was overvalued by 21% relative to the US dollar in July 2020 (and 37% relative to the euro).

9.4 A First Theory of Exchange-Rate Determination: Purchasing-Power Parity

The **purchasing-power parity (PPP)** theory is the simplest and most widely accepted theory explaining the variation of currency exchange rates. PPP describes the forces that determine exchange rates in the long run.

Purchasing Power Parity: a theory of exchange rates whereby a unit of any given currency should be able to buy the same quantity of goods in all countries.

The PPP theory is based on a principle called the **law of one price**. According to the law of one price, a good must sell for the same price in all locations.

If the law of one price were not true, unexploited profit opportunities would exist. The process of taking advantage of differences in prices in different markets is called arbitrage.

Arbitrage: the process of buying a good in one market at a low price and selling it in another market at a higher price in order to profit from the price difference.

If arbitrage occurs, eventually prices that differed in two markets would necessarily converge.

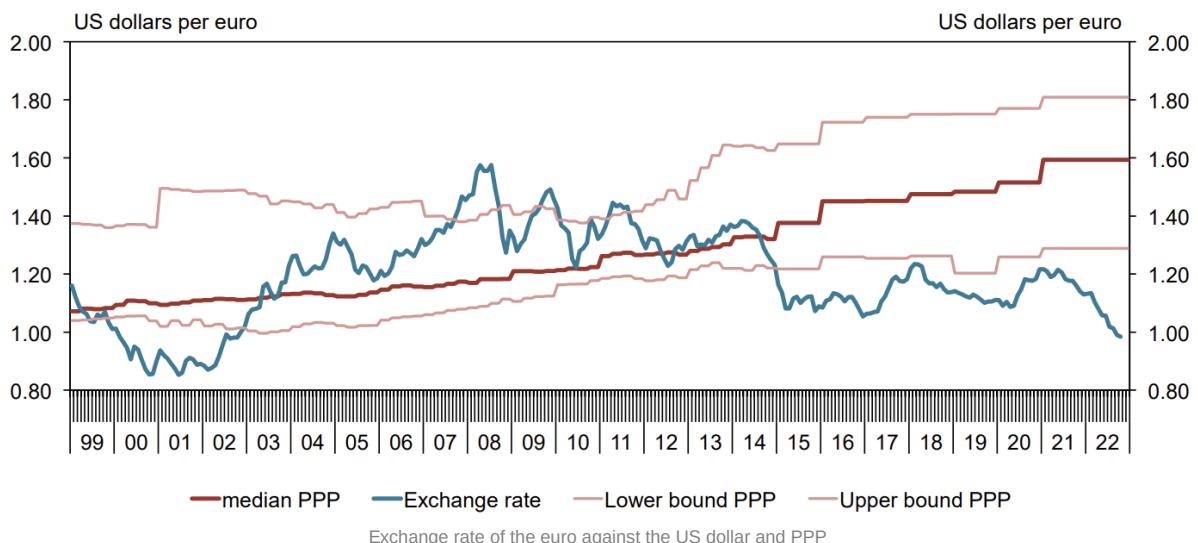
According to the PPP theory, a currency must have the same purchasing power in all countries and exchange rates move to ensure that (otherwise arbitrage occurs and the prices differed in two markets converge to the same price level).

The nominal exchange rate between two currencies reflects the different price levels in the countries.

So if a euro buys the same quantity of goods in Germany (where prices are measured in Euro) as in Japan (where prices are measured in Yen), then the number of yen per euro must reflect the prices of goods in Germany and Japan. For example, if a kilo of coffee is priced at ¥500 in Japan and €5 in Germany, then the nominal exchange rate must be ¥100 per euro ($\frac{¥500}{5} = ¥100$ per €), otherwise the purchasing power of the euro would not be the same in the two countries.

Limitations of the PPP theory:

- Many goods are not easily traded or shipped from one country to another
- Tradable goods are not always perfect substitutes when they are produced in different countries



10. A Macroeconomic Theory of the Open Economy

The goal of the model is to highlight the forces that determine the economy's trade balance and exchange rate.

Key Macroeconomic Variables in an Open Economy:

- net exports
- net foreign investment (= net capital outflow)
- nominal exchange rates
- real exchange rates

Two basic Assumptions of a Macroeconomic Model of an Open Economy:

1. The model takes the economy's GDP as given
2. The model takes the economy's price level as given (nominal=real)

To understand forces at work in an open economy, we must consider two markets:

1. The market for loanable funds

Co-ordinates savings, investment and net capital outflow

2. The market for foreign currency

Co-ordinates people who wish to exchange domestic to

10.1 The Market for Loanable Funds

To understand the market of loanable funds, we start at the identity:

$$\underbrace{S}_{\text{Saving}} = \underbrace{I}_{\text{Domestic investment}} + \underbrace{NCO}_{\text{Net capital outflow}}$$

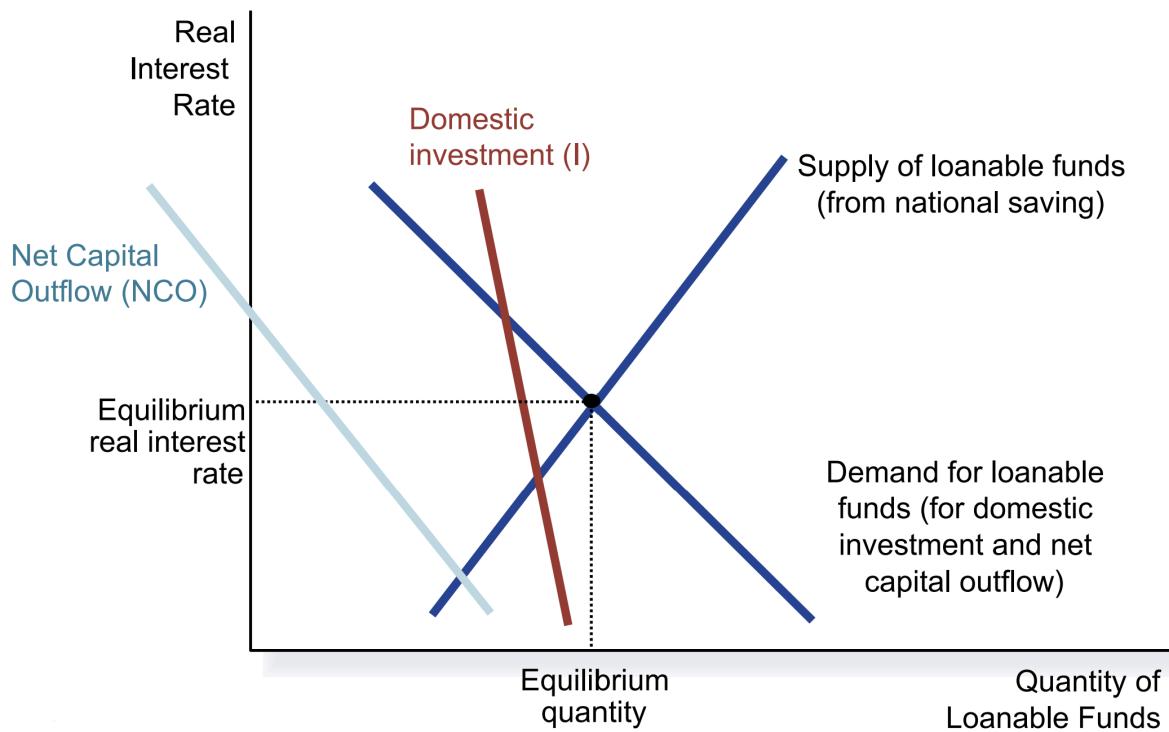
The supply of loanable funds comes from national saving (S). Whenever a nation saves some of its income, it can use that money to finance the purchase of domestic capital or to finance the purchase of an asset abroad.

A higher real interest rate encourages people to save.
⇒ increase the supply of loanable funds.

The demand for loanable funds comes from domestic investment (I) and net capital outflows (NCO).

A higher real interest rate discourages firms to invest in new buildings, machines & equipment. A higher real interest rate discourages people to buy assets abroad.
⇒ reduces the quantity of loanable funds demanded

The [interest rate adjusts to bring supply and demand for loanable funds into balance](#). At the equilibrium interest rate, the amount that people want to save exactly balances the desired quantities of investment and net capital outflows.



The Market for Loanable Funds: The interest rate in an open economy is determined by the supply and demand for loanable funds. National saving is the source of the supply of loanable funds. Domestic investment and net capital outflow are the sources of the demand for loanable funds. At the equilibrium interest rate, the amount that people want to save exactly balances the amount that people want to borrow for the purpose of buying domestic capital and foreign assets.

10.2 The Market for Foreign-Currency Exchange

To understand the market of loanable funds, we start at the identity:

$$\underbrace{NCO}_{\text{Net capital outflow}} = \underbrace{NX}_{\text{Net exports}}$$

The two sides of the foreign currency exchange market are represented by NCO and NX. NCO (net capital outflow) represents the imbalance between the purchases and sales of assets. NX (net exports) represents the imbalance between exports and imports of goods and services.

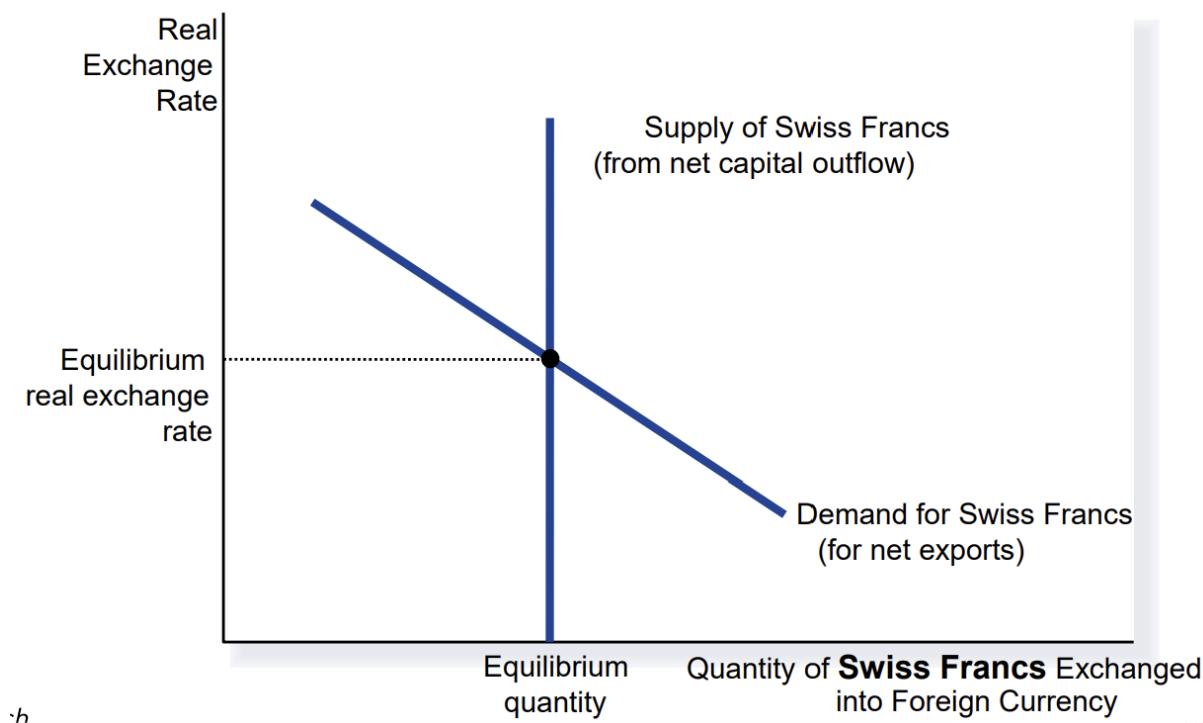
For an economy as a whole, NCO and NX must balance, or:

$$\text{Supply of domestic currency} = \text{demand for domestic currency}$$

In the market for foreign-currency exchange, Swiss Francs are traded for foreign currencies. [The price that balances the supply and demand for foreign-currency is the real exchange rate](#). A real appreciation of the Swiss Franc will be defined as a higher level of its real exchange rate.

A low real exchange rate of the Swiss Franc, leads to strong exports and a high demand for its currency.

The demand curve (NX) for domestic currency is downward sloping. The supply curve (NCO) is vertical because the quantity of Swiss Francs supplied is unrelated to the (current) real exchange rate. It does depend upon the expected change in the real exchange rate during the investment horizon. We (implicitly) assume that the best forecast for the future real exchange rate is its current level. This implies that the (expected) change in the real exchange rate equals zero.



The Market for Foreign-Currency Exchange: At the equilibrium real exchange rate, the number of Swiss francs supplied to buy foreign assets exactly balances the number of Swiss francs demanded to buy net exports.

10.3 Equilibrium in the Open Macroeconomy

The Market for Foreign-Currency Exchange: The real exchange rate adjusts to balance the supply and demand for Swiss Francs. At the equilibrium real exchange rate, the demand for Swiss Francs to buy net exports exactly balances the supply of Swiss Francs to be exchanged into foreign currency to buy assets abroad.

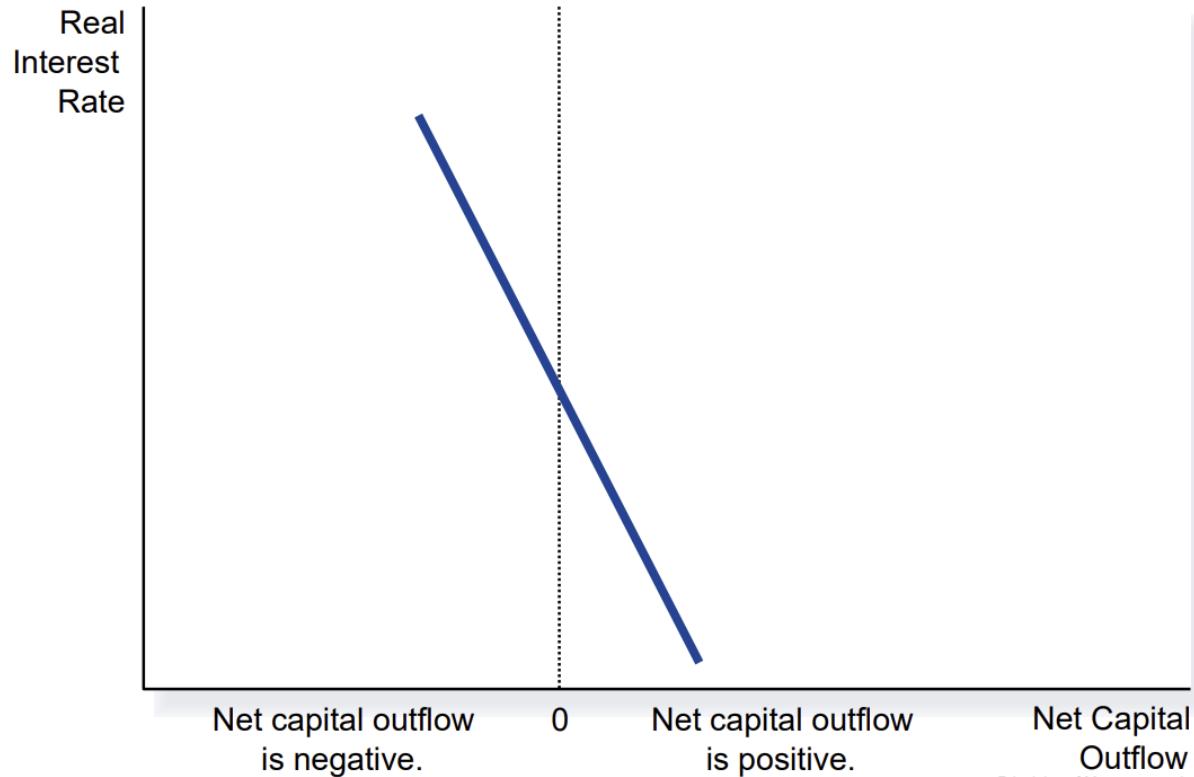
In the market for loanable funds, supply comes from national saving and demand comes from domestic investment and net capital outflow.

In the market for foreign currency exchange, supply comes from net capital outflow and demand comes from net exports.

Equilibrium in the Open Economy:

- The market for loanable funds and the market for foreign exchange are related to each other
- Net capital outflow links the loanable funds market and the foreign currency exchange market
- The key determinant of net capital outflow is the real interest rate (When the swiss interest rate is high, owning swiss assets is more attractive and swiss net capital outflow is therefore low)

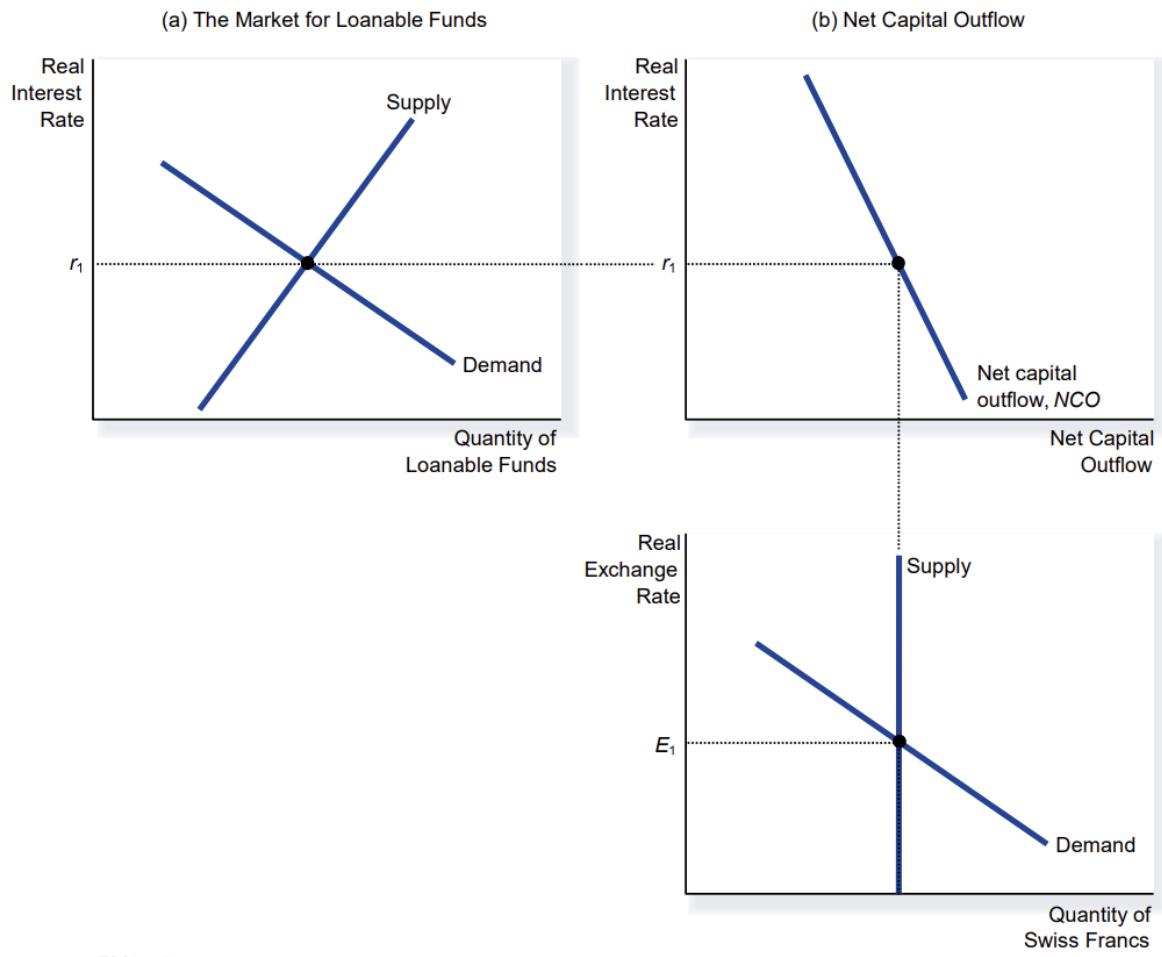
Because a higher domestic real interest rate makes domestic assets more attractive, it reduces net capital outflow. Note the position of zero on the horizontal axis: net capital outflow can be positive or negative. A negative value of net capital outflow means that the economy is expecting a net inflow of capital.



How Net Capital Outflow Depends on the Interest Rate: The lower the real interest rate, the more attractive it is to invest in assets abroad and vice versa.

10.3.2 Simultaneous Equilibrium in the Two Markets

Prices in the loanable funds market and the foreign-currency exchange market adjust simultaneously to balance supply and demand in these two markets. As they do, they determine the macroeconomic variables of national saving, domestic investment, net foreign investment (net capital outflow), and net exports.



In panel (a), the supply and demand for loanable funds determine the real interest rate. In panel (b), the interest rate determines net capital outflow, which provides the supply of Swiss francs in the market for foreign currency exchange. In panel (c), the supply and demand for Swiss francs in the market for foreign currency exchange determine the real exchange rate.

10.4 How Policies and Events Affect an Open Economy

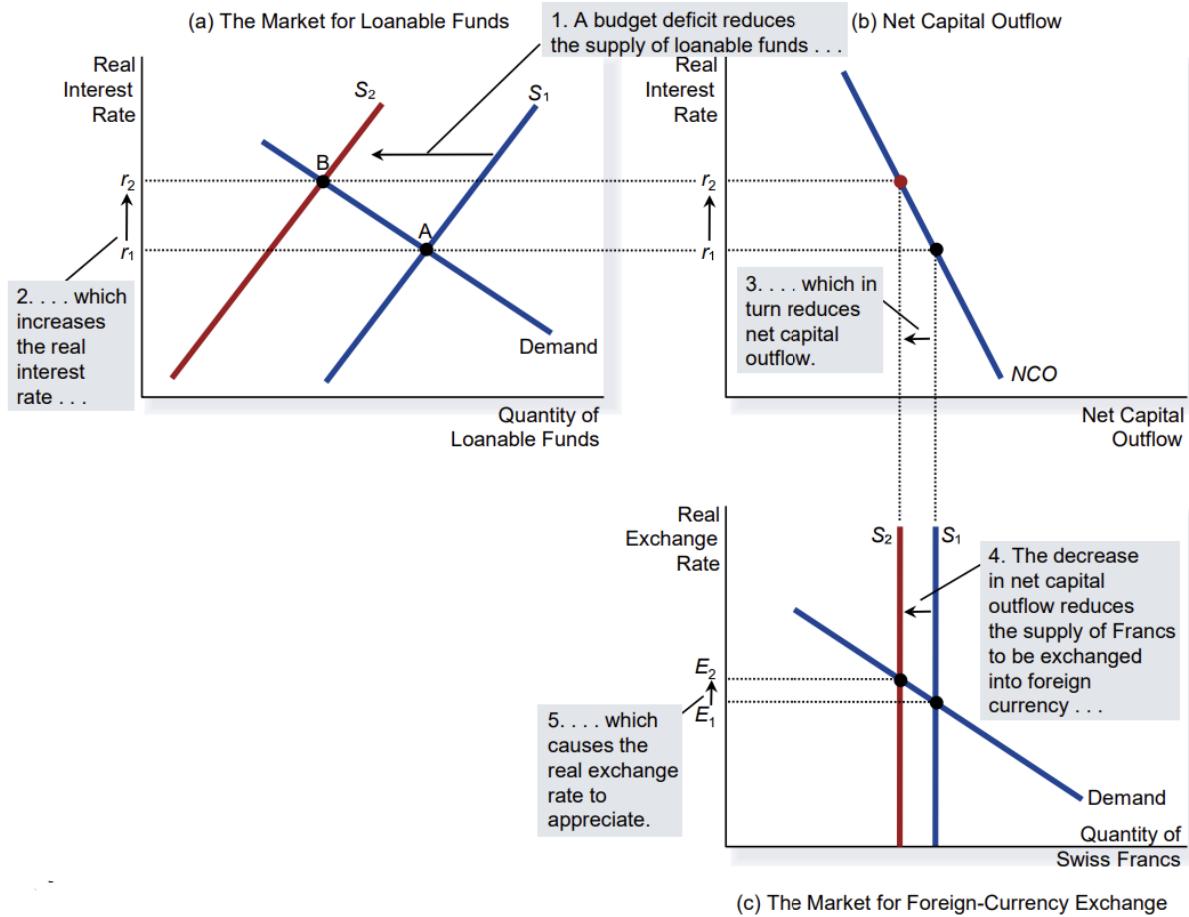
The magnitude and variation in important macroeconomic variables depend on the following:

- Government budget deficits
- Trade policies
- Political and economic stability

10.4.1 The Effects of Government Budget Deficit

In an open economy, government budget deficits:

- reduce the supply of loanable funds
- drive up the interest rate
- cause net foreign investment (net capital outflow) to fall
- crowd out domestic investment
- reduces the supply of Swiss Francs to be exchanged into foreign currency
- Causes the real exchange rate to appreciate



If the Swiss government runs a budget deficit, it reduces the supply of loanable funds from S_1 to S_2 in panel (a). The interest rate rises from r_1 to r_2 to balance the supply and demand for loanable funds. In panel (b), the higher interest rate reduces net capital outflow (because people now invest there instead of abroad). Reduced net capital outflow, in turn, reduces the supply of Swiss francs in the market for foreign currency exchange in panel (c). This fall in the supply of Swiss francs causes the real exchange rate to appreciate from E_1 to E_2 . The appreciation of the exchange rate pushes the trade balance towards deficit.

10.4.2 Trade Policy: Effect of an Import Quota

Trade policy: a government policy that directly influences the quantity of goods and services that a country imports or exports.

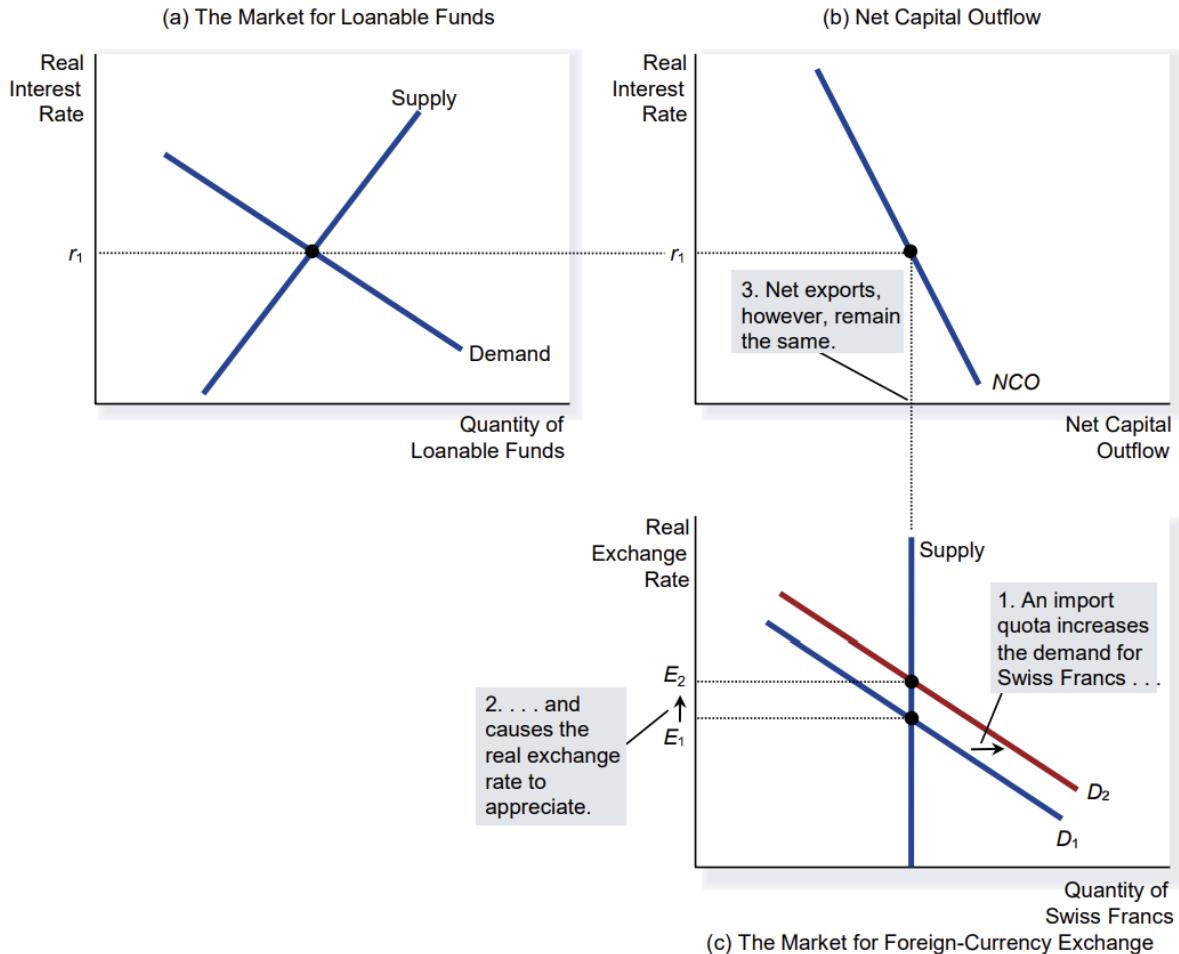
Tariff: A tax on an imported good

Import quota: A limit on the quantity of a good produced abroad and sold domestically

Because they do not change national saving or domestic investment, trade policies do not affect the trade balance. For a given level of national saving and domestic investment, the real exchange rate adjusts to keep the trade balance the same. Trade policies have a greater effect on microeconomic than on macroeconomic markets.

Effect of an import quota: Because foreigners need Swiss francs to buy Swiss net exports, there is an increased demand for Swiss francs in the market for foreign-currency. This leads to an appreciation of the real exchange rate. There is no change in the interest rate because nothing happens in the loanable funds market. There will be no change in net exports. There is no change in net foreign investment even though an import quota reduces imports. An appreciation of the Swiss franc in the foreign exchange market encourages imports and discourages exports. This offsets the initial increase in net exports due to the import quota.

Trade policies do not affect the trade balance



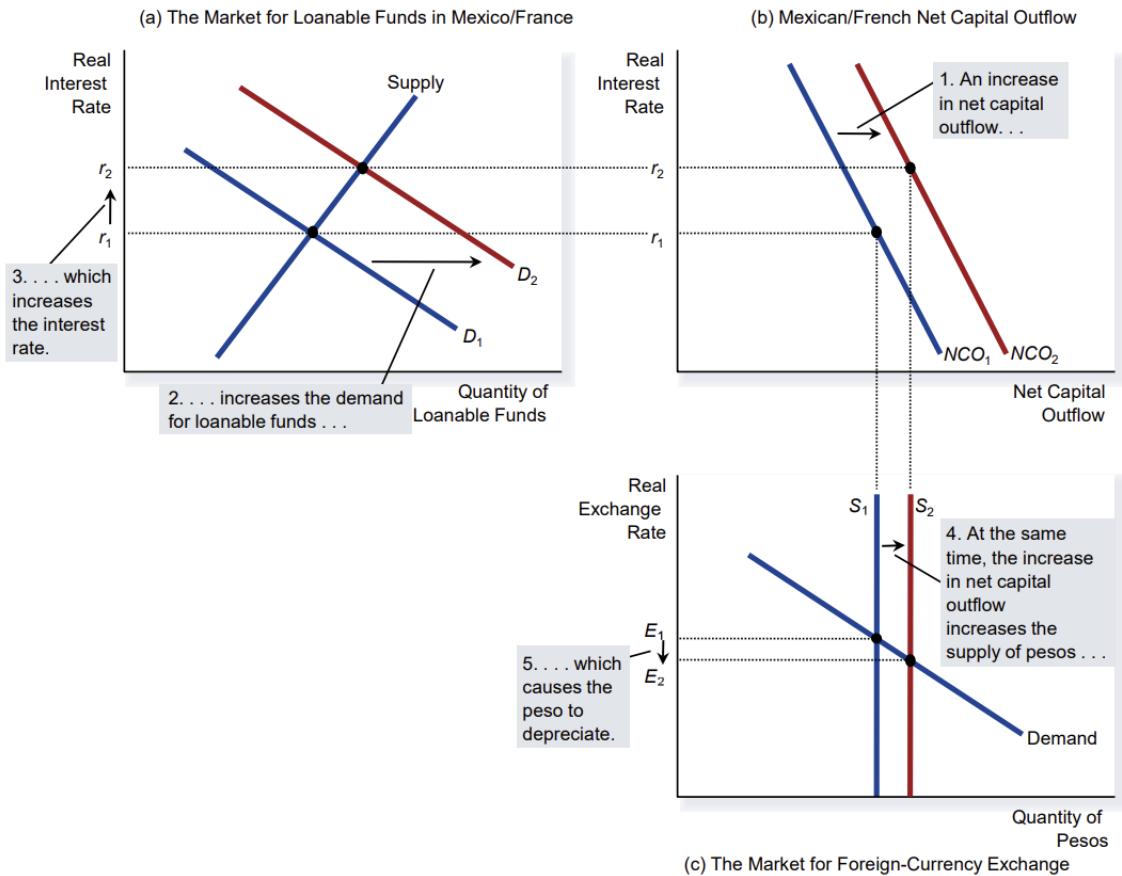
The Effects of an Import Quota: When the EU imposes a quota on the import of Japanese cars, nothing happens in the market for loanable funds in panel (a) or to net capital outflow in panel (b). The only effect is a rise in net exports for any given real exchange rate. As a result, the demand for euros in the market for foreign currency exchange rises, as shown by the shift from D_1 to D_2 in panel (c). This increase in the demand for euros causes the value of the euro to appreciate from E_1 to E_2 . This appreciation of the euro tends to reduce net exports, offsetting the direct effect of the import quota on the trade balance.

10.4.3 Political Instability and Capital Flight

Capital flight is a large and sudden reduction in the demand for assets located in a country

If investors become concerned about the safety of their investments, capital can quickly leave an economy. Interest rates increase and the domestic currency depreciates.

Capital flight has its largest impact on the country from which the capital is fleeing, but it also affects other countries. When investors around the world observed political problems in Mexico in 1994, they sold some of their Mexican assets and used the proceeds to buy assets of other countries. This increased Mexican net capital outflow. The demand in the loanable funds market increased, which increased the interest rate. This increased the supply of pesos/euros in the foreign-currency exchange market, causing a depreciation.



The Effects of Capital Flight: If people decide that Mexico is a risky place to keep their savings, they will move their capital to safer havens, resulting in an increase in Mexican capital outflow. So the demand for loanable funds in Mexico rises from D_1 to D_2 , as shown in panel (a), and this drives up the Mexican real interest rate from r_1 to r_2 . Because net capital outflow is higher for any interest rate, that curve also shifts to the right from NCO_1 to NCO_2 in panel (b). At the same time, in the market for foreign currency exchange, the supply of pesos rises from S_1 to S_2 , as shown in panel (c).

This increase in the supply of pesos causes the currency to depreciate from E_1 to E_2 , so the pesos become less valuable compared to other currencies.

▼ 10.5 Summary of the Chapter

- Net exports are the value of domestic goods and services sold abroad minus the value of foreign goods and services sold domestically
- Net capital outflow is the acquisition of foreign assets by domestic residents minus the acquisition of domestic assets by foreigners
- An economy's net capital outflow always equals its net exports
- An economy's saving can be used to either finance investment at home or to buy assets abroad (so $S = I + NX$)
- The nominal exchange rate is the relative price of the currency of two countries
- The real exchange rate is the relative price of the goods and services of two countries
- When the nominal exchange rate changes so that each Swiss Franc buys more foreign currency, the Swiss Franc is said to appreciate or strengthen
- When the nominal exchange rate changes so that each Swiss Franc buys less foreign currency, the Swiss Franc is said to depreciate or weaken
- According to the theory of purchasing-power parity, a unit of currency should buy the same quantity of goods in all countries
- The nominal exchange rate between the currencies of two countries should reflect the countries' price levels in those countries
- To analyze the macroeconomics of open economies, two markets are central—the market for loanable funds and the market for foreign-currency exchange

- In the market for loanable funds, the interest rate adjusts to balance supply for loanable funds (from national saving) and demand for loanable funds (from domestic investment and net capital outflow)
- In the market for foreign-currency exchange, the real exchange rate adjusts to balance the supply of Swiss Francs (for net capital outflow) and the demand for Swiss Francs (for net exports)
- Net capital outflow is the variable that connects the two markets
- A policy that reduces national saving, such as a government budget deficit, reduces the supply of loanable funds and drives up the interest rate
- The higher interest rate reduces net capital outflow, reducing the supply of Swiss Francs
- The Swiss Franc appreciates, and net exports fall

11. Business Cycles

Business cycles: fluctuations in economic activity such as employment and production

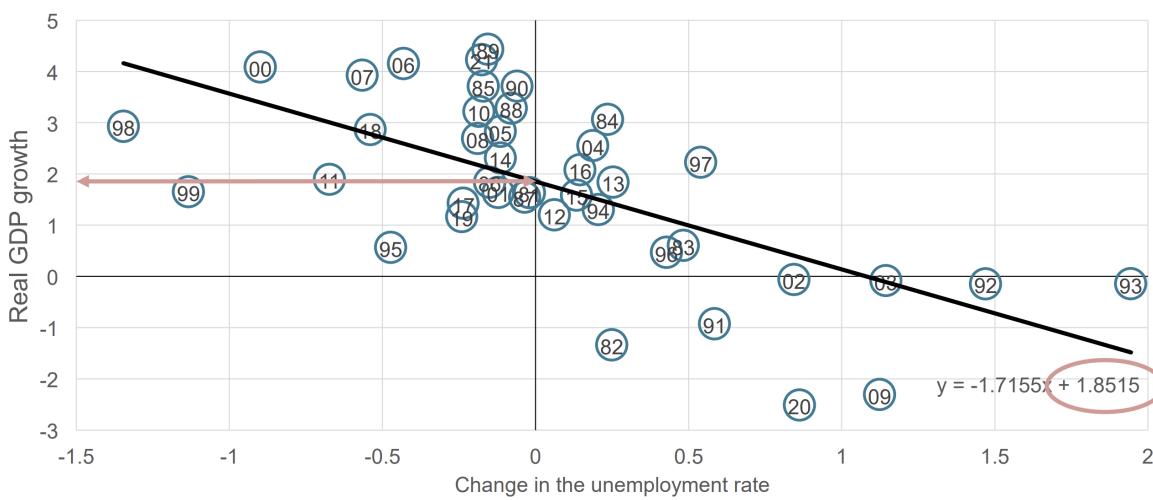
11.1 Three Key Facts About Economic Fluctuations

1. **Economic fluctuations are irregular and difficult to predictable**
 - Fluctuations in the economy are often called the business cycle
 - These fluctuations do not follow regular or easily predictable patterns
2. **Most macroeconomic variables fluctuate together**
 - Most macroeconomic variables that measure some type of income or production fluctuate closely together
 - Although many macroeconomic variables fluctuate together, they fluctuate by different amounts
3. **As output falls, unemployment rises**
 - Changes in real GDP are inversely related to changes in the unemployment rate
 - During times of recession, unemployment rises substantially

11.2 Okun's Law

Okun's law states that in order to keep the unemployment rate steady, real GDP needs to grow at or close to its potential

There is a time-lag between any downturn in economic activity and a rise in unemployment and vice versa. Unemployment is a therefore a lagged indicator.



11.3 Economic Activity Fluctuates from Year to Year

Recession is a period of declining real incomes and rising unemployment. Often defined as a period with at least two successive quarters of negative economic growth.

Depression is a severe recession

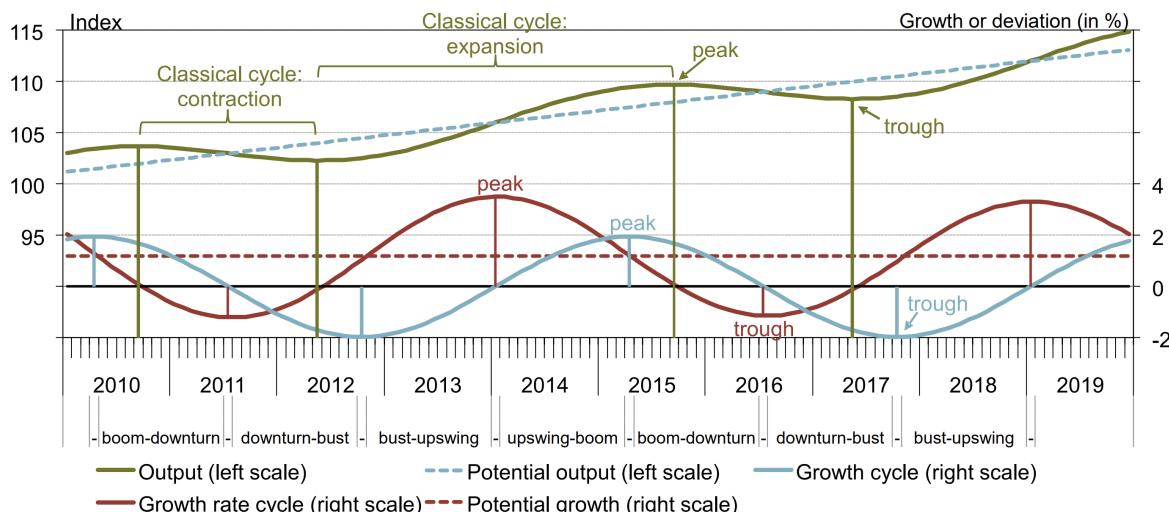
Central to the analysis of business cycles is GDP over time. GDP shows a pattern on peaks and troughs and periods where growth is accelerating, decelerating and in some cases is declining.

A **peak** is where economic activity reaches a high and real output begins to decline

A **trough** is where economic activity reaches a low and the decline ends

In practise there are three definitions of the business cycle that are widely (and interchangeably) used:

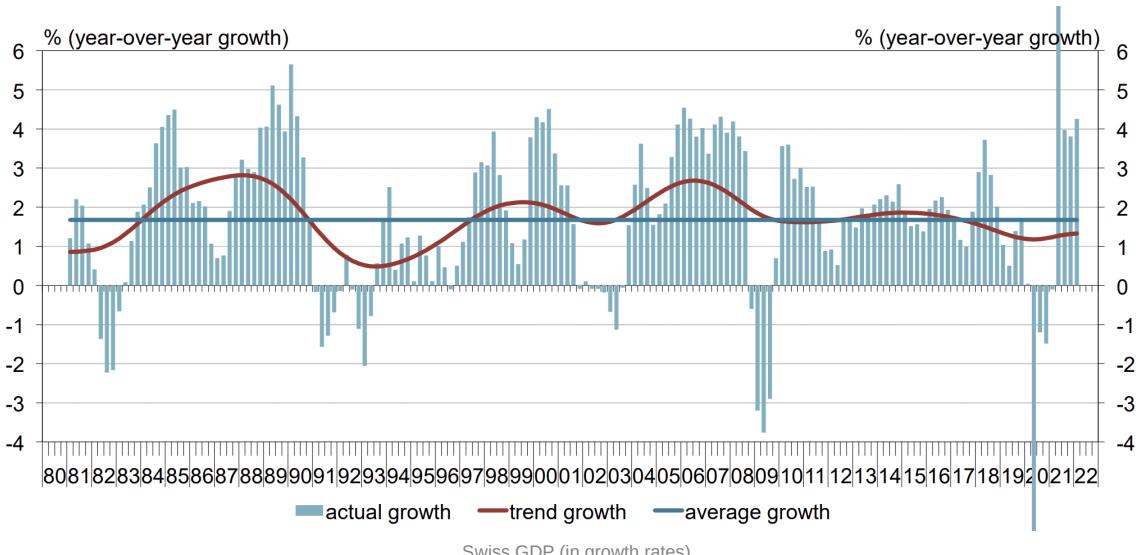
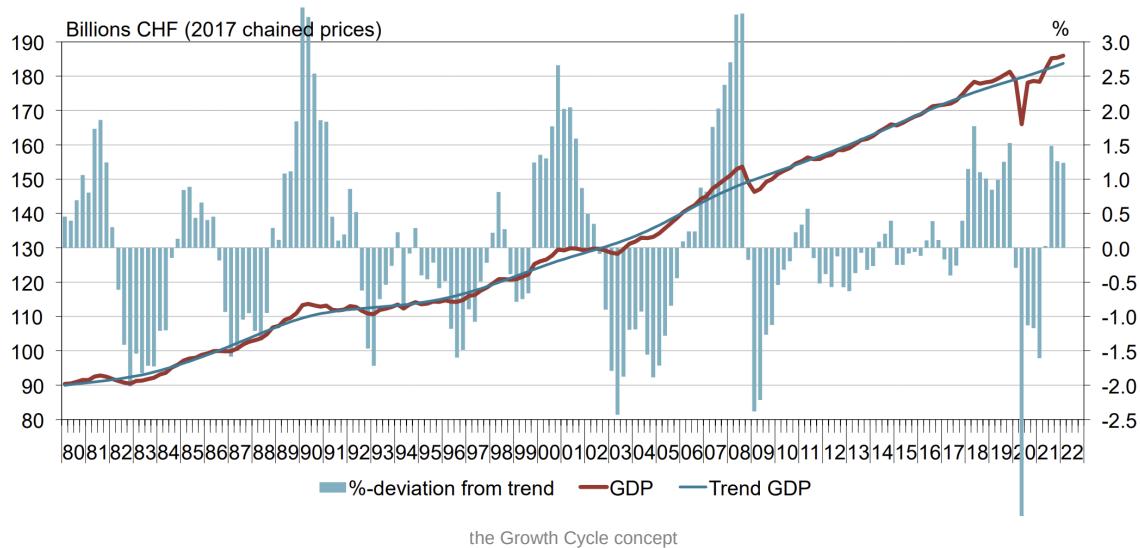
- **Classical cycle:** Looking at the level of GDP
- **Growth cycle:** Looking at the deviation of GDP from potential (/trend)
- **Growth rate cycle:** Looking at the growth of GDP

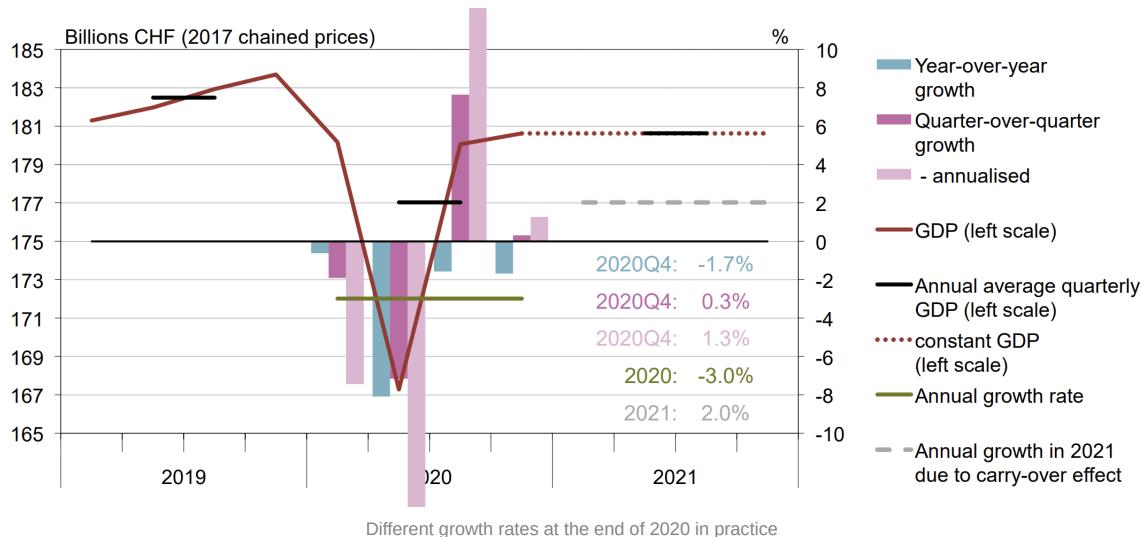
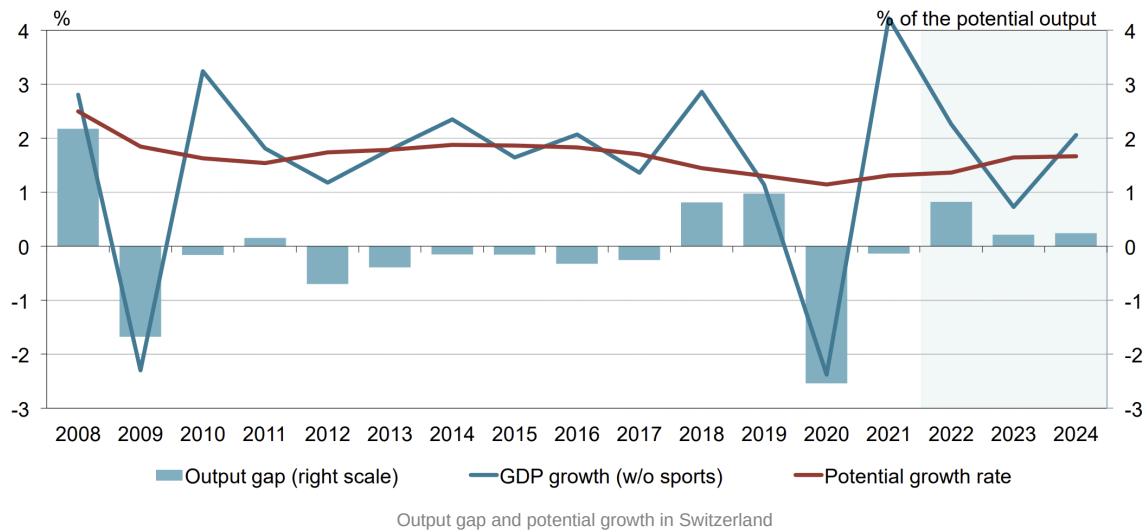


	Bust - upswing	Upswing - boom	Boom - downturn	Downturn - bust
Economic activity	<ul style="list-style-type: none"> Gross Domestic Product (GDP), industrial production, and other measures of economic activity levels are below potential, while growth is already above normal. 	<ul style="list-style-type: none"> Activity measures show above-average, albeit declining, growth rates. Production levels are higher than normal. 	<ul style="list-style-type: none"> Activity measures show further decelerating and now below average rates of growth. Production levels are still higher than normal. 	<ul style="list-style-type: none"> Activity measures are below potential. Albeit growth is lower than normal, it is picking up again.
Capital spending	<ul style="list-style-type: none"> Some recovery visible in investment goods. Upturn most pronounced in orders for light producer equipment. 	<ul style="list-style-type: none"> Capital spending expands rapidly. 	<ul style="list-style-type: none"> The growth of capital spending slows down. 	<ul style="list-style-type: none"> Decreased spending most evident in orders for new business equipment.
Employment	<ul style="list-style-type: none"> Layoffs are happening, but at a reduced pace and new hiring does not yet occur. The unemployment rate is rising 	<ul style="list-style-type: none"> Business turn to overtime and temporary employees. Some rehiring as overtime hours rise. The unemployment rate stabilises and starts falling 	<ul style="list-style-type: none"> Business slows its rate of hiring. The unemployment rate continues to fall but at slowly decreasing rates. 	<ul style="list-style-type: none"> Business first cuts hours and freezes hiring, followed by outright layoffs. The unemployment rate starts to rise.
Inflation	<ul style="list-style-type: none"> Inflation continues to fall. 	<ul style="list-style-type: none"> Inflation picks up modestly. 	<ul style="list-style-type: none"> Inflation further accelerates. 	<ul style="list-style-type: none"> Inflation decelerates but with a lag.

Business cycle phases when using the Growth Cycle concept

▼ Example: Swiss GDP (in levels) and the business cycle





11.4 Trends

There is some disagreement between economists about economic time series. One such disagreement is about the nature of trends.

A **trend** is the underlying long-term movement in a data series

Stationary data is time series data that has a constant mean value over time

Deterministic trends are independent of time for the series being analysed

Nonstationary data is time series data where the mean value can either rise or fall over time

Stochastic trend variables change by some random amount in each time period

Assuming GDP shows a deterministic trend, rising 1.4% on average in Switzerland, then temporary policy measures can be applied when it deviates from trend. If the data exhibits a trend that is stochastic then temporary policy measures might be applied that are unnecessary and possibly distorting.

11.5 Procylical and Countercyclical Movements in Macroeconomic Data

Comovement refers to the movement of pairs of variables.

Economists compare another economic variable such as inflation or employment with GDP over time and see if any relationship can be determined.

Procyclical is a variable that is above trend when GDP is above trend. (Real wages is an example – it tends to increase faster during booms)

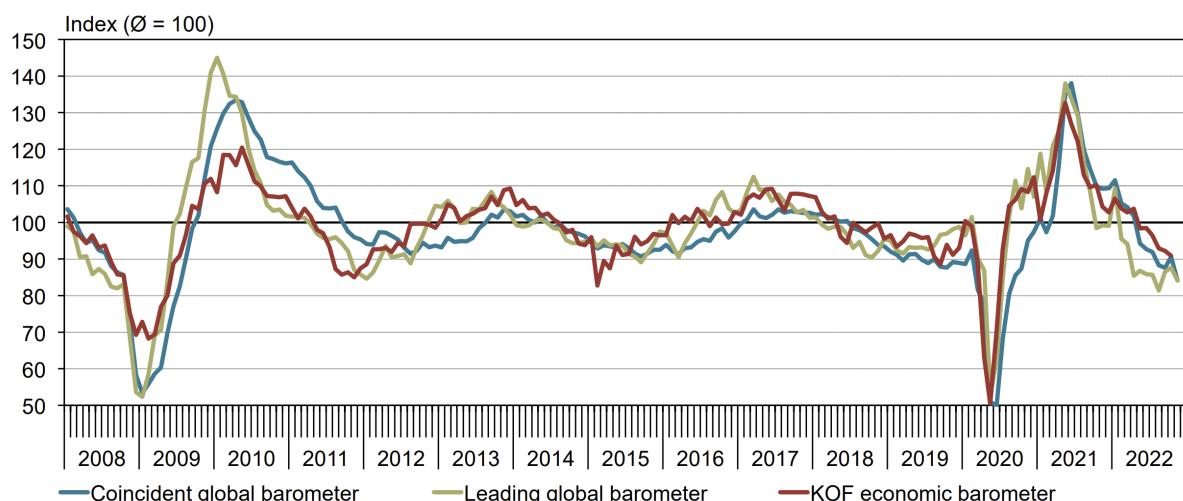
Countercyclical is a variable is that is below trend when GDP is above trend. (Unemployment is an example since unemployment tends to fall as GDP grows)

Economicsts use [cyclical indicators](#) to identify potential turning points in economic activity:

A **coincident** indicator occurs at the same time as changes in economic activity

A **leading** indicator can be used to foretell future changes in economic activity

A **lagging** indicator occurs after changes in economic activity have occurred

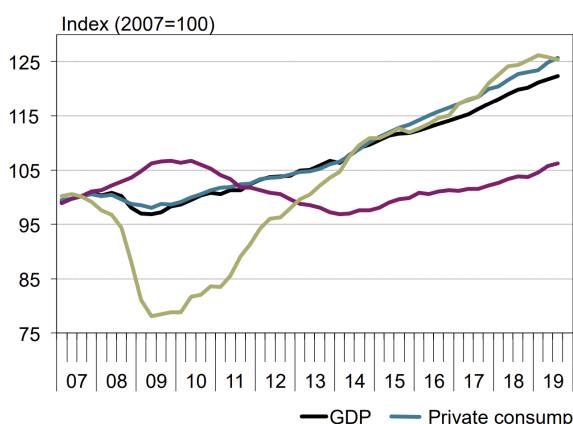


The KOF-FGV Global Economic Barometers and the KOF Economic Barometer for Switzerland

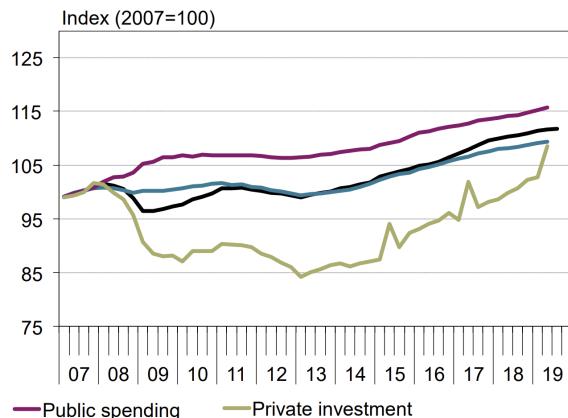
11.6 Causes of Changes in the Business Cycle

We know that the economy is made up of households and firms, so it is reasonable to expect that the behaviour of these two elements of the economy have a role to play in how economic activity changes.

- USA



- Euro area



Comparing the US and the euro area: a demand-side view

11.6.1 Household spending decisions

Households decide on how much labour to supply. The amount of labour supplied depends in part on the real wage rate. The rate of growth of wages in relation to prices affects consumers' purchasing power. Households will also make decisions based on changes in interest rates, house prices and taxation. Increases in interest rates may encourage a rise in saving and a reduction in consumption. People borrow on the strength of the value of their property. Tax rates changes affect different people in different ways.

11.6.2 Firms' decision making

If firms face strong demand they are likely to: (i) increase output, (ii) take on more workers and (iii) buy more raw materials and semi-finished goods.

Some firms may invest in new equipment and new premises or even acquire other firms. If the real wage rate falls then firms can afford to hire more workers. If productivity levels rise then costs can be lowered and firms can be more competitive. Firms will respond to changes in inventory levels by expanding or contracting output as necessary.

11.6.3 External sources

Movements in exchange rates affect the competitiveness of domestic and foreign firms through changes in import and export prices. Economic activity abroad can impact on countries as consumption and investment decisions by firms and consumers abroad change. Unpredictable events such as war and natural hazards can have a big impact.

11.6.4 Government policy

Governments collect taxes and spend the revenues. Changes in taxation and government spending (including infrastructure spending) affect the economy. Although independent, central banks have targets to achieve. Changes in interest rates will affect both households and firms and policy decisions like quantitative easing and measures designed to help ease credit flows to business and households.

11.6.5 Confidence and expectations

Households and firms not only make decisions based on current needs but also on the future. Expectations and confidence of the future shape decisions by firms and households and can play a significant part in swings in economic activity.

11.7 Business Cycle Models

Attempts to try to understand how business cycles occur have led to models which differ in the assumptions that are made.

If markets are assumed to clear \Rightarrow (new) classical models

If markets are not assumed to clear \Rightarrow (new) Keynesian model

What does "market clearing" mean? The market is cleared when the price brings demand and supply into balance, allowing anyone to purchase or sell whatever they want at that price. A market clearing occurs when supply and demand are equal. There must be a shortfall or surplus if the market does not clear.

11.7.1 Supply-side – the (new) classical models

Labour markets clear but workers have imperfect information. Based around the concept of anticipated and unanticipated price changes.

If price rises are anticipated (i.e. ideal world without this form of business cycle)

- Workers will recognize that real wages would fall without a nominal wage increase and will supply less labour
- The demand for labour will be greater than the supply of labour, so nominal wages will rise
- This will keep the real wage effectively constant at the new equilibrium

If workers do not anticipate (and do not realise) the change in prices

- Real wages fall, firms demand more labour but workers continue to offer the same amount of labour
- The demand for labour will be in excess of supply and nominal wages will rise but less than prices
- The result is that output will rise but the real wage will fall

11.7.2 Supply-side – the (new) Keynesian models

Keynes believed markets do not clear quickly. Markets are impaired by the existence of (sticky prices and) sticky wages. Nominal wages are often slow to adjust in the economy due to long-term employment contracts. An increase in prices will make real wages lower, increasing labour demand and output.

11.7.3 Demand-side – the (new) classical models

Information problems might lead to sub-optimal decisions. Firms might not be able to distinguish between inflation and a relative price change. An observed increase in the price of the goods they supply might lead them to produce more. (For example: The manager of a firm thinks the price gone up because of a higher demand, and not because of the inflation. Then the firm will maybe produce more, however the demand isn't higher)

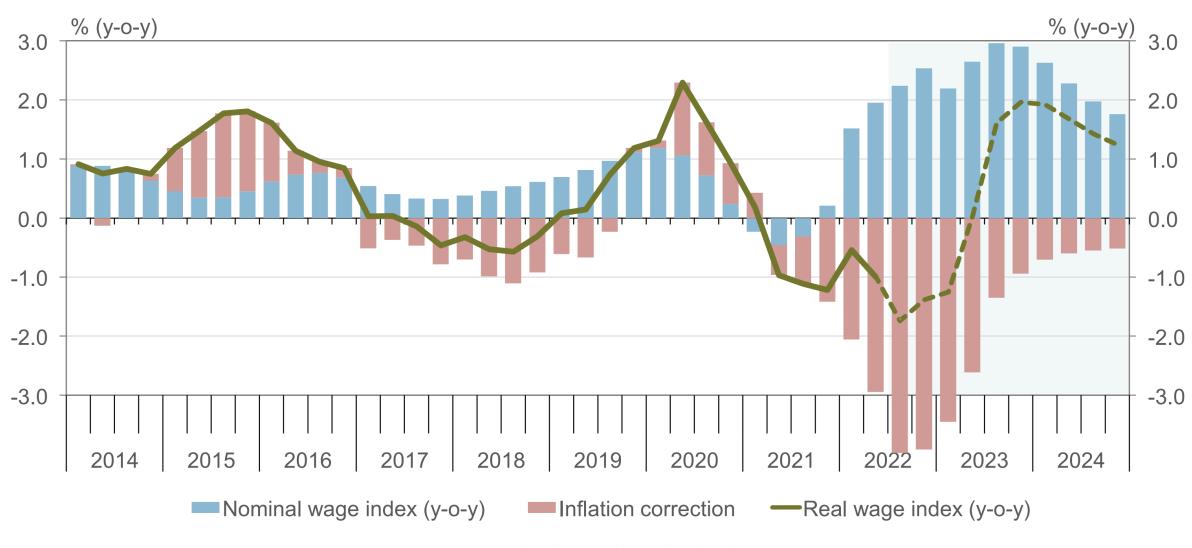
11.7.4 New Classical models are driven by asymmetric information

The New Classical interpretation rests on this **inflation fallacy**

- Workers misinterpret a rise in nominal wages as a rise in real wages
- Firms misinterpret a rise in prices as an increase in demand for their goods

The economy moves to a temporary equilibrium where the expectations of some economic actors are not fully incorporated because they are incorrect. Over time, workers realize that real wages have changed and negotiate for wage rises. Firms' costs rise and some firms cut back supply. The economy returns to trend output but at a higher price level once expectations have fully adjusted.

Cyclical implications when output is above trend: Unemployment is countercyclical and employment will be above trend and so be procyclical. Inflation is procyclical, but real wages will be countercyclical because as output rises real wages fall.



11.7.5 Demand-side – the (new) Keynesian models

The prices of some goods and services can also be slow to respond to changes in the economy. This can be due to menu costs or contractual arrangements. Because not all prices adjust instantly to changing conditions, an unexpected increase in the price level leaves some firms with lower-than-desired prices. This increases sales and cause firms to increase the quantity of goods and services supplied.

In the short run, output increases above trend but prices do not change because of being sticky. Over time, the economy returns to trend, because firms will eventually be able to raise prices. Employment, real wages and inflation are procyclical and unemployment is countercyclical.

11.7.6 Real business cycle models – Production factors determine supply on goods and service markets

In this model both positive and negative technology shocks affect productivity. Assume there are no market imperfections and firms and households are profit and utility maximizing. A negative technology shock would reduce labour productivity and the demand for labour fall.

Output also drops and unemployment increases. Output falls because aggregate supply falls. Prices rise.

When aggregate supply shifts, the expectations of economic actors are still correct. (Effectively it is the long-run supply curve that shifts). Therefore there is no reason for governments or central banks to intervene. In real business cycle models, employment, labour productivity and real wages are procyclical.

▼ Summary of the Chapter

- Economies experience periods of changing levels of economic activity
- Key macroeconomic data is often time-series data which raises questions about the validity and reliability of statistical tests applied to data sets
- Economic growth appears to follow a trend which rises over a period of time
- Deviations from this trend are known as the business cycle
- The business cycle has characteristic features such as peaks in economic activity, slowdown, troughs and upturns with key turning points
- Trends can be stationary and nonstationary. Nonstationary, data can exhibit deterministic trends which change by a constant amount independent of time or be stochastic where the trend variable changes by a random amount
- Macroeconomic data can be viewed in pairs with one of the pairs being GDP. The variable compared may be procyclical or countercyclical.
- Collecting macroeconomic data allows economists to view indicators as leading, coincident or lagging
- Changes in the business cycle can be caused by changes in household and firms' decision making, by external shocks, government policy and changes in confidence or expectations of the future
- Business cycle models differ in the assumptions they make about the extent to which markets clear and the relationship between the supply side and demand side of the economy
- Real business cycles emphasize the effects of changes in technology as causes of changes in economic activity

12. Keynesian Economics and IS-LM Analysis

Keynes' primary message was that recessions and depressions can occur because of inadequate aggregate demand. He was a critic of classical economic theory, because it could explain only the long-run effects of policies.

“In the long run we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past, the ocean will be flat.”

Keynesian economics assumes prices are sticky. In what follows, we will (initially) assume prices to be constant.

12.1 The Keynesian cross

12.1.1 Planned and actual spending

Full employment is when those people who want to work at the going rate are able to find a job

Keynesian analysis makes a crucial distinction between planned and actual behaviour. You may plan to save €100 per month, but if your overtime is cut, then you may actually save only €20 per month. A manufacturer may plan to maintain a stock of 50,000 of its widgets, but if sales slow, it may actually find it has 150,000 widgets in stock.

Planned spending, saving or investment is the intended actions of households and firms

Actual spending, saving or investment is the realized outcome resulting from actions of households and firms

If planned and actual outcomes can be very different, then it is possible for the equilibrium level of national income to be below the full employment level

12.1.2 Equilibrium of the Economy

We know GDP is divided among four components: consumption, investment, spending by government and net exports. Imagine a situation where at every point, total expenditure (E) in the economy given by $E = C + I + G + NX$ was exactly the same as national income. We could represent this in the diagram as a 45 degree line.

In the Keynesian cross diagram, the 45° line connects all points where total spending would be equal to national income. It is equivalent to the capacity of the economy – the aggregate supply (AS) curve.

The $C + I + G + NX$ line is a function of income (spending depends on income). If Income is higher, spending will also be higher and so the $C + I + G + NX$ line has a positive slope. The vertical intercept of the $C + I + G + NX$ line, given as E_0 , is termed autonomous expenditure. This is the component of expenditure which does not depend on income/output.

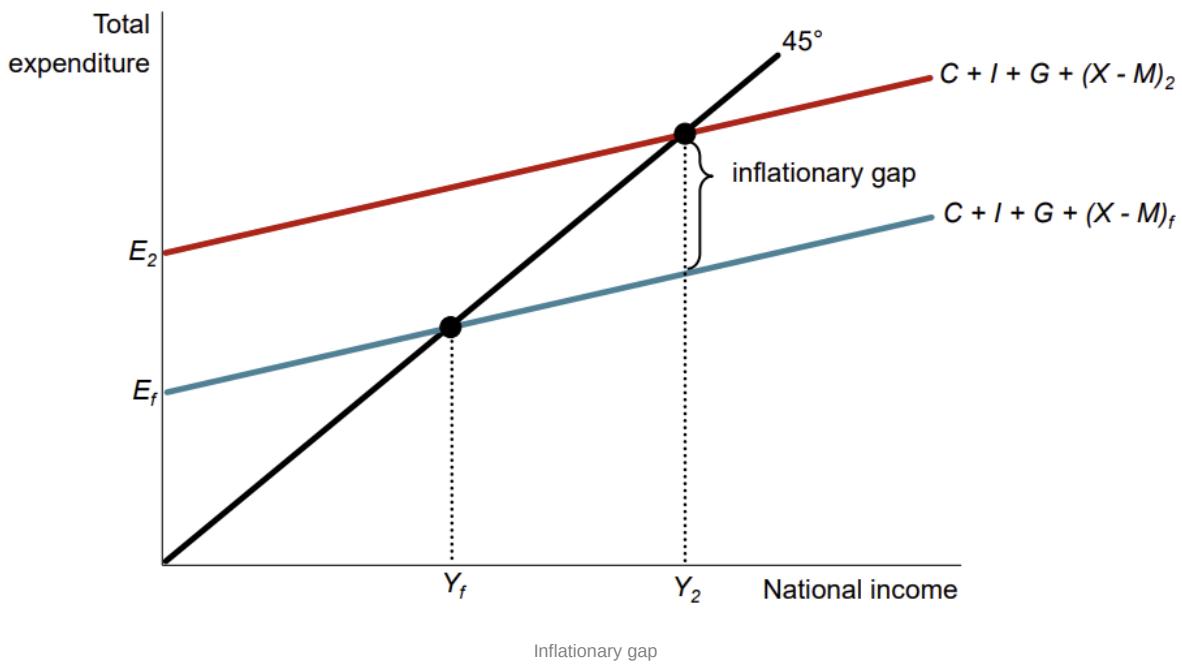
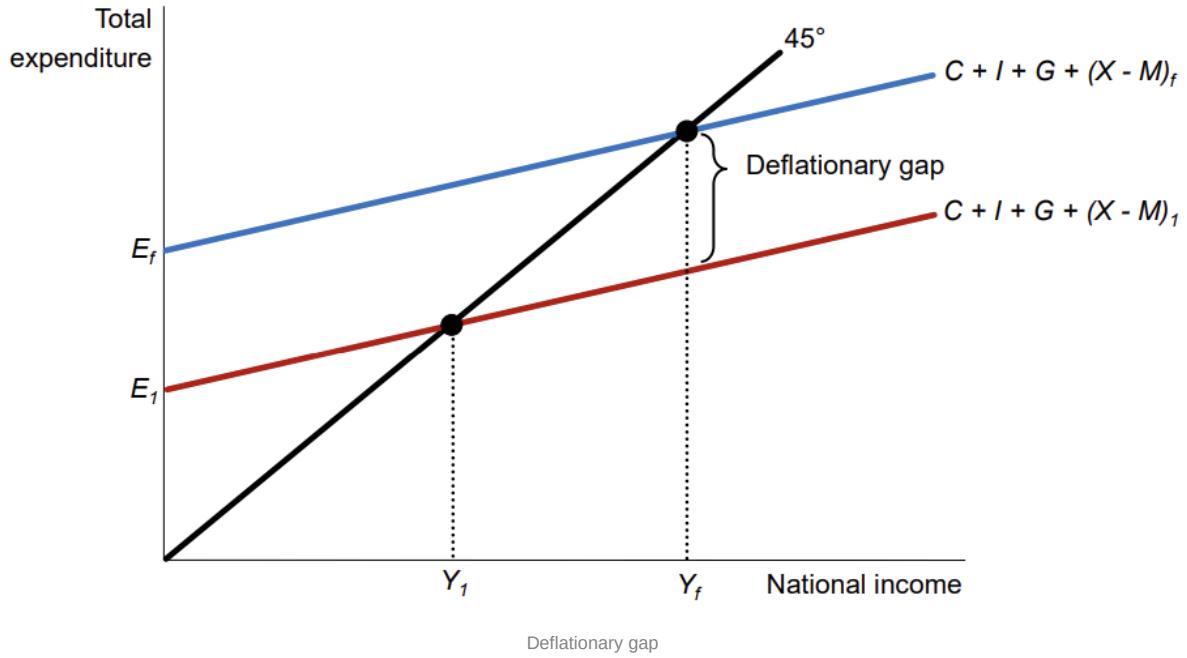
Autonomous expenditure: spending that is not dependent on income/output

12.1.3 Keynesian cross: Deflationary gap and Inflationary gap

To eradicate an inflationary or deflationary gap a government can influence the components of aggregate demand through fiscal and monetary policy bringing about an equilibrium that is closer to the full employment level of national income.

The **deflationary or output gap** is the difference between full employment output and expenditure when expenditure is less than full employment output.

The **inflationary gap** is the difference between full employment output and actual expenditure when actual expenditure is greater than full employment output.



Explanation: The 45 degree line shows all the points where consumption spending equals income. The vertical intercept of the expenditure line shows autonomous expenditure. The economy is in equilibrium where the expenditure line, $C + I + G + (M - X)_1$, cuts the 45 degree line. In the first panel, this equilibrium is lower than full employment output (Y_f) at Y_1 ; there is insufficient demand to maintain full employment output. The government would need to shift the expenditure line up to $C + I + G + (M - X)_f$, to eliminate the deflationary gap. In the second panel the equilibrium is higher than full employment output – the economy does not have the capacity to meet demand. In this case the government needs to shift the $C + I + G + (M - X)_2$ line down to $C + I + G + (X - M)_f$ to eliminate the inflationary gap.

12.2 The Multiplier Effect and the Accelerator Principle

The $C + I + G + NX$ line is referred to as the [expenditure function](#):

$$E = C + I + G + NX$$

The economy will be in equilibrium when planned expenditure is equal to actual expenditure, so $E = Y$.

The positive slope of the expenditure function implies that planned spending rises as income rises.

The **multiplier effect** refers to the additional shifts in aggregate demand that result when expansionary fiscal policy increases income and thereby increases consumer spending

Government purchases are said to have a multiplier effect on aggregate demand. A euro of government purchases can generate more than a euro of aggregate demand.

For example, suppose that investment demand increases by one. Firms then produce to meet this demand. That the national product has increased means that the national income has increased. Consequently consumption demand increases, and firms then produce to meet this demand. Thus the national income and product rises by more than the increase in investment. The multiplier effect is greater than one.

The multiplier effect can be strengthened by response of investment to higher levels of demand. The **accelerator principle** relates the rate of change of demand to the rate of change in investment. Suppose a machine can produce 1,000 DVDs per week. Current demand is 800 DVDs per week. A 10% rise in demand can be accommodated with no new investment in machinery. Suppose the following year demand rises by 20%, taking demand to 1,056 units. The firm may decide against investing in new capacity and raise prices in face of the shortage. But if demand rises by 25% the firm is very likely to invest in a new machine. An increase in demand of 25% has led to an 'accelerated' rise in investment of 100%.

12.2.1 A Formula for the Spending Multiplier

The **marginal propensity to consume (MPC)** is the fraction of extra income that a household consumes rather than saves.

The **marginal propensity to save (MPS)** is the fraction of extra income that a household saves rather than consumes.

For example, suppose that the MPC is $3/4$. This means that for every CHF that a household earns, the household spend $3/4$ of it and saves $1/4$. $\Rightarrow MPS + MPC = 1$.

To gauge the impact on spending of a change in government purchases, we follow the effects step by step:

$$\text{Multiplier} = 1 + MPC + MPC^2 + MPC^3 + MPC^4 + \dots$$

With the geometric sum formula and the identity $MPS + MPC = 1$, we get:

$$\text{Multiplier} = \frac{1}{1 - MPC} = \frac{1}{MPS}$$

If for example the MPC is $3/4$, then the multiplier will be: $\text{Multiplier} = \frac{1}{1-3/4} = 4$

Assume the government pays €10 billion to Nucelec to build three new nuclear power stations. Nucelec employees and contractors receive increased income and spend it on consumer goods. In this case, a €10 billion increase in government spending on power plants generates €40 billion of increased demand for goods and services.

12.2.2 Other Applications of the Multiplier Effect

The logic of the multiplier effect is not restricted to changes in government purchases. It applies to any event that alters spending on any components of GDP – consumers' expenditure, investment, net exports, or government spending.

Recall Autonomous expenditure: spending that is not dependent on income/output. Any increase in autonomous expenditure will lead to a multiplier effect. The additional spending that follows as a result of the multiplier effect is termed induced expenditure.

The multiplier is important because it shows how the economy can amplify the impact of changes in spending. A small initial change in C, I, G or NX can end up having a large effect on national income. The eventual change in income is determined by the marginal propensity to consume (MPC).

In an open economy any extra income is not simply either spent or saved – some of the extra may be spent on imports or go to the government in taxes. Savings, imports, and taxes are classified as withdrawals (W) from the circular flow of income and are endogenous as they are directly related to changes in income.

MPT: the marginal propensity to taxation

MPM: the marginal propensity to import

MPS: the marginal propensity to save

The multiplier would now be expressed as:

$$\text{Multiplier} = \frac{1}{MPS + MPT + MPM} = \frac{1}{MPW}$$

The MPW will reduce the size of the multiplier and thus the impact on national income of any increase in autonomous expenditure. [The higher the MPW the smaller the multiplier and the shallower/flatter the slope of the expenditure line.](#)

12.2.3 Mathematical example

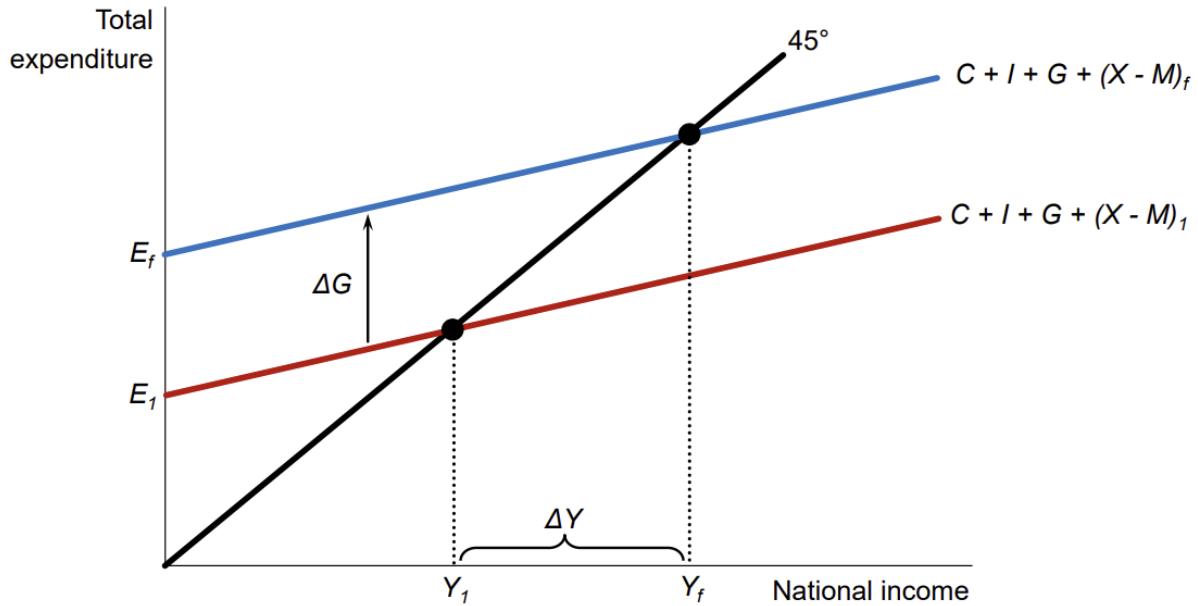
- Assume that consumption, taxation and imports depend linearly on income
 - $C = C_0 + (1 - mps) * Y - T$
 - $T = T_0 + mpt * Y$
 - $M = M_0 + mpm * Y$
- Assume investment, government spending and exports exogenously given
- This implies (given $E = C + I + G + X - M$)
 - $E = C_0 + (1 - mps) * Y - (T_0 + mpt * Y) + I_0 + G_0 + X_0 - (M_0 + mpm * Y)$
 - $E = C_0 + (1 - mps) * Y - T_0 - mpt * Y + I_0 + G_0 + X_0 - M_0 - mpm * Y$
 - $E = (C_0 - T_0 + I_0 + G_0 + X_0 - M_0) + ((1 - mps) - mpt - mpm) * Y$
 - $E = E_0 + (1 - mps - mpt - mpm) * Y = E_0 + (1 - mpw) * Y$
 - In equilibrium $Y = E \rightarrow Y = 1/mpw * E_0$

12.2.4 Equilibrium of Planned Withdrawals and Injections

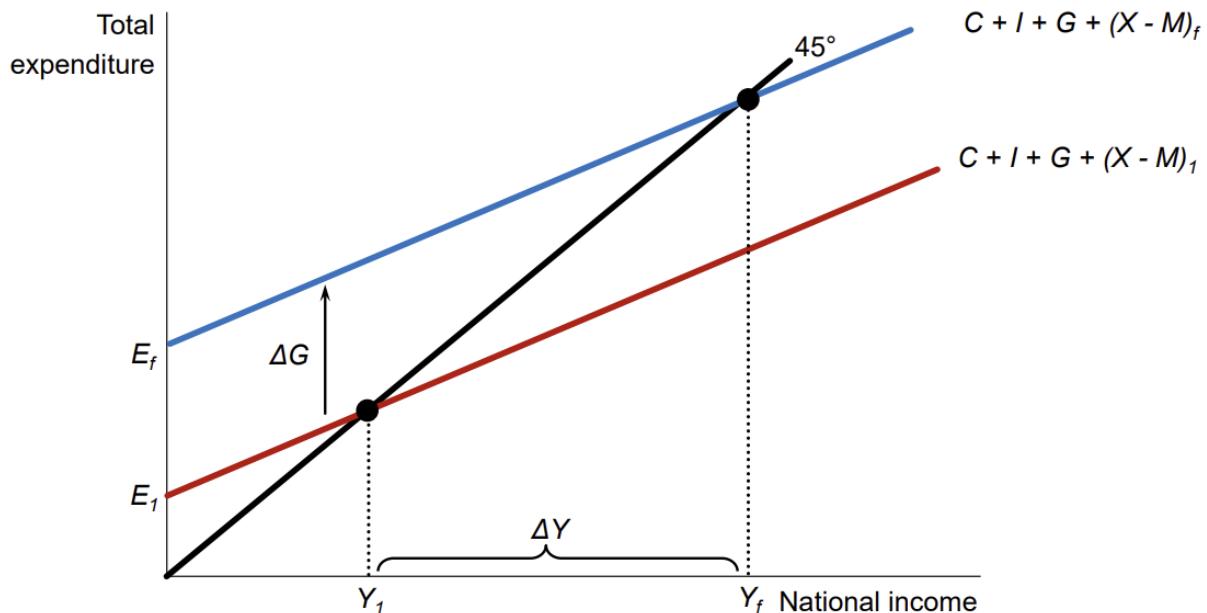
Let us start with the national income identity:

$$\text{Output} \equiv \text{Expenditure} \equiv \text{Income}$$

In equilibrium planned expenditure equals actual income. This equilibrium is referred to as equilibrium in the goods market as all output is bought by households and firms. However, if actual withdrawals were greater than planned injections then the economy would be experiencing a deficiency in demand. Then a government may decide to increase its spending and income will rise by even more because of the multiplier.



The panel above shows a relatively shallow expenditure line which would mean that the marginal propensity to withdraw would be high and the value of the multiplier would be relatively low. Using the symbol Δ meaning change, the impact on national income ΔY of a change in government spending ΔG would be more limited in comparison to the effect as shown in the panel below, where the expenditure line is much steeper reflecting a higher value of the multiplier where the MPW was relatively low. In this case it takes a smaller rise in government spending to achieve the same increase in national income.



12.2.5 Example: Equilibrium of Planned Withdrawals and Injections

Let us assume:

- full employment output (Y) is 120 billion
- private saving, $S = 0.1 \cdot Y$
- Taxes, $T = 0.2 \cdot Y$
- Imports, $M = 0.2 \cdot Y$

Assume investment (I) was 20 billion, government spending (G) 20 billion and exports (X) 10 billion. Hence, total injection is $I + G + X = 50$ billion.

Note, that the following holds:

$$Y = C + I + G + X - M \Leftrightarrow \underbrace{(Y - C - T)}_{\text{Savings}} + T + M = I + G + X$$

$$\Rightarrow \text{Planned } S + T + M = \text{Planned } I + G + X$$

Now we can plug in the values:

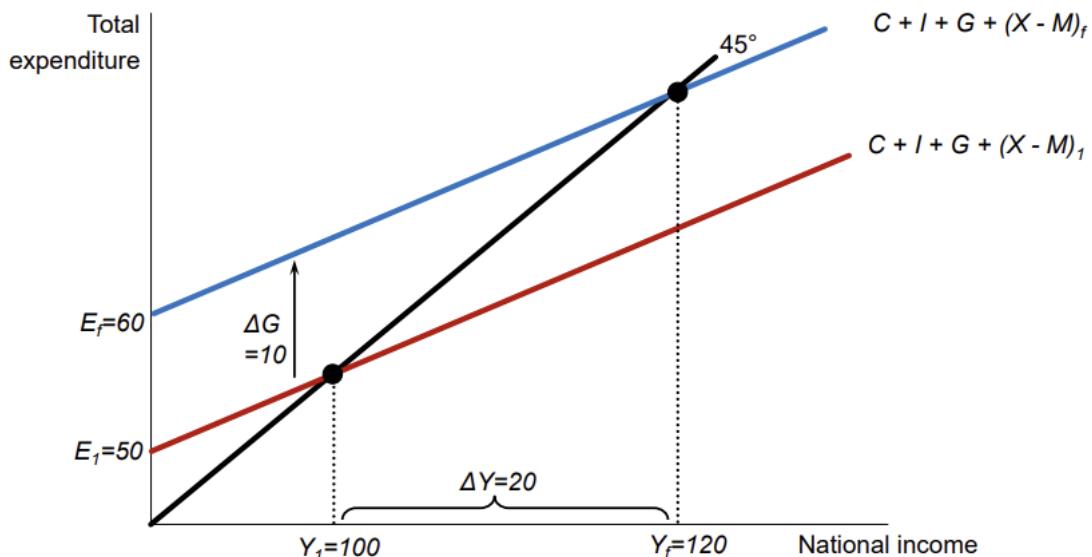
$$\begin{aligned} \text{Planned } S + T + M &= \text{Planned } I + G + X \\ 0.1 \cdot Y + 0.2 \cdot Y + 0.2 \cdot Y &= 20 + 20 + 10 \\ 0.5 \cdot Y &= 50 \end{aligned}$$

$$\Rightarrow Y = 100, \text{ and the multiplier} = 2$$

So this equilibrium is below the level of full employment output by 20 billion (The deflationary gap is 20 billion). The government could manage demand to achieve full employment output in different ways. It could increase its spending by 10 billion and through the multiplier effect see Y rise to 120 billion (*multiplier* = 2).

$$\begin{aligned} \text{Planned } S + T + M &= \text{Planned } I + G + X \\ 0.1 \cdot Y + 0.2 \cdot Y + 0.2 \cdot Y &= 20 + 30 + 10 \\ 0.5 \cdot Y &= 60 \end{aligned}$$

$$\Rightarrow Y = 120$$



Keynesian cross: Deflationary gap – higher multiplier

12.3 The IS and LM Curves

IS-LM describes equilibrium in goods market and the money market and together determines general equilibrium in the economy.

- IS – Investment and Saving
- LM – Liquidity and Money

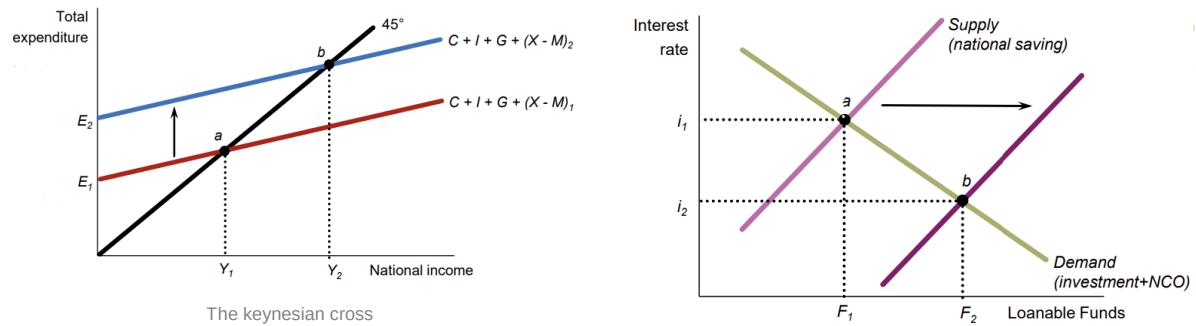
What links the goods and money markets is the rate of interest i .

12.3.1 The IS Curve

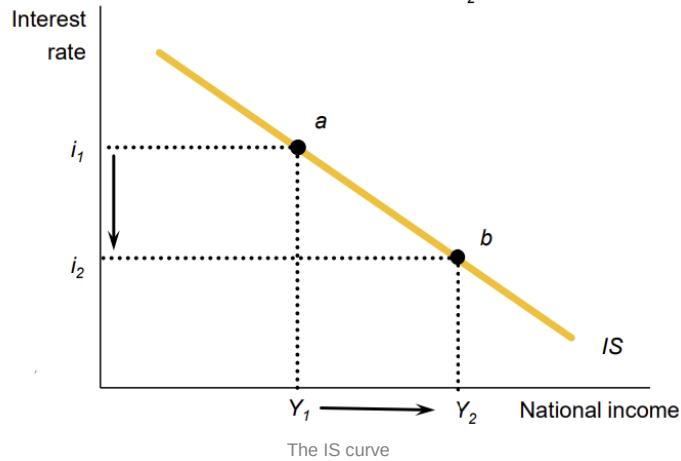
The IS curve shows the relationship between the interest rate and level of income (Y) in the goods market.

The IS curve is derived from the Keynesian cross diagram and shows all possible points of equilibrium in the goods market associated with a particular interest rate and level of income.

In the first panel initial equilibrium is where $C + I + G + NX_1$ line crosses the 45 degree line at a point a . This point is plotted on the IS curve as point a . An increase in $C + I + G + NX_1$ to $C + I + G + NX_2$ shows a new equilibrium point in the goods market (b) which is plotted on the IS curve as b . These two points are connected to form the IS curve.



A fall in the interest rate raises the expenditure line and a new equilibrium occurs at point b



The IS curve shows an inverse relationship between the interest rate and output. Note that the slope of the IS curve depends on how responsive consumption and investment expenditures are to changes in interest rates and on the size of the multiplier. The more responsive are C and I , the flatter is the IS curve. Shifts in the IS curve come about as a result of changes in autonomous expenditure.

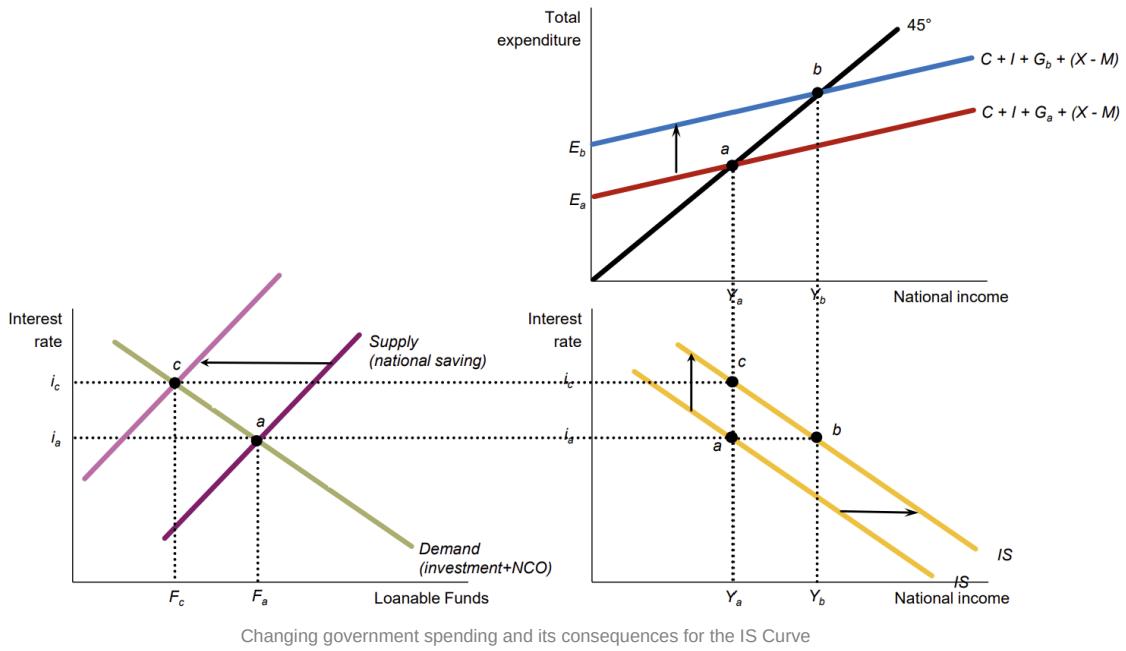
A rise in government spending, independent of any change in interest rates, would lead to a shift of the IS curve to the right. A fall in exports would lead to a shift of the IS curve to the left.

12.3.2 Changing government spending and its consequences for the IS Curve

Keynesian-cross perspective: For a given interest rate i_a , an increase of G_a to G_b leads to an increase of Y_a to Y_b .

In the IS diagram this implies that the IS curve shifts to the right.

Loanable-market perspective: For a given level of income Y_a , an increase of G_a to G_b leads to lower national savings pushing the interest from i_a to i_b . In the IS diagram this implies that the IS curve shifts upward.



Changing government spending and its consequences for the IS Curve

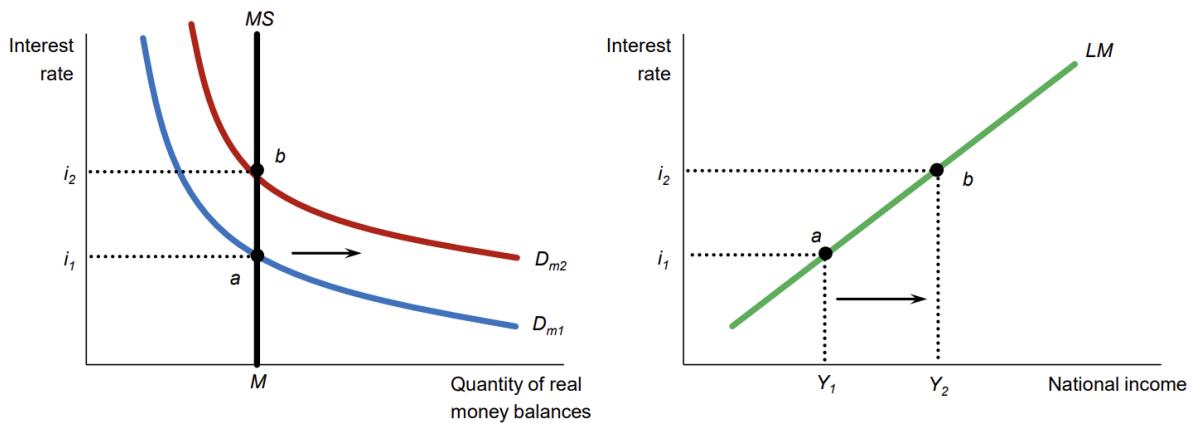
12.3.3 The LM Curve

The LM curve shows all points where the money market is in equilibrium given a combination of the rate of interest and national income.

Positive slope indicates that an increase in income is associated with an increase in the interest rate. The slope depends on how responsive the demand for money is to changes in interest rates.

The LM curve shifts to the right/left if the central bank expands/contracts money supply.

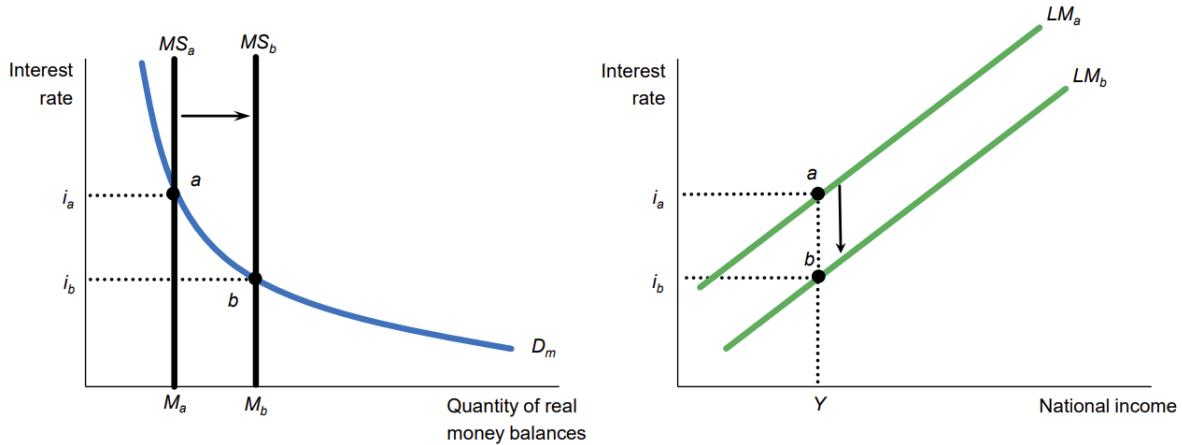
In the first panel, the money market is in equilibrium where the demand for money D_m equals the supply of money M_s at a point a . This point is plotted on the LM curve in the second panel as point a^* . An increase in the demand for money causes a shift of the curve to the right to D_{m1} with a new equilibrium point of b . This is plotted in the second panel as point b^* and the points connected form the LM curve.



12.3.4 Changing money supply and its consequences for the LM Curve

If the central bank increases money supply from M_a to M_b , then (for a given money demand) the interest rate has to fall. Only for a lower interest rate society is willing to hold the additional money (assuming that e.g. income is unchanged).

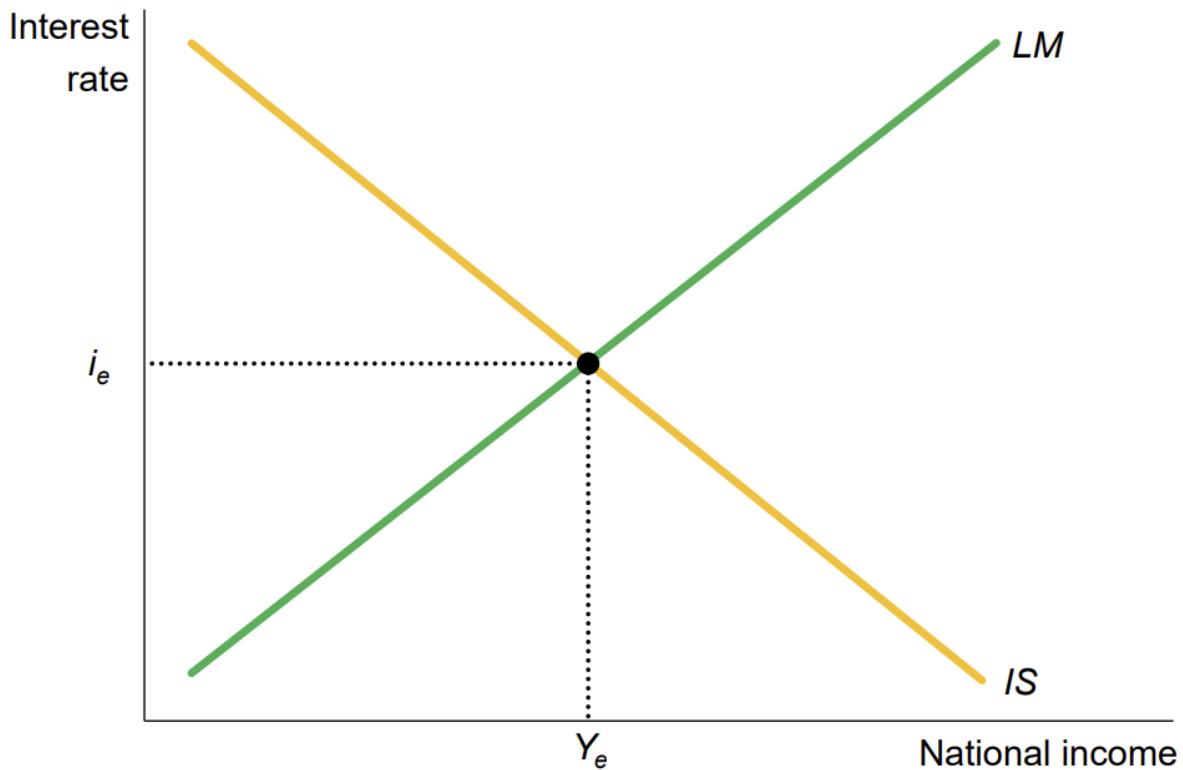
In the LM diagram this implies that the LM curve shift downward (or to the right). For the same level of income (Y), the interest rate will now be lower. (or: to keep the interest rate constant, income needs to increase (moving the money demand curve outward/upward))



12.4 General Equilibrium Using the IS-LM Model

Recall that each point on the: The IS curve represents a point of equilibrium in the goods market and the LM curve represents a point of equilibrium in the money market.

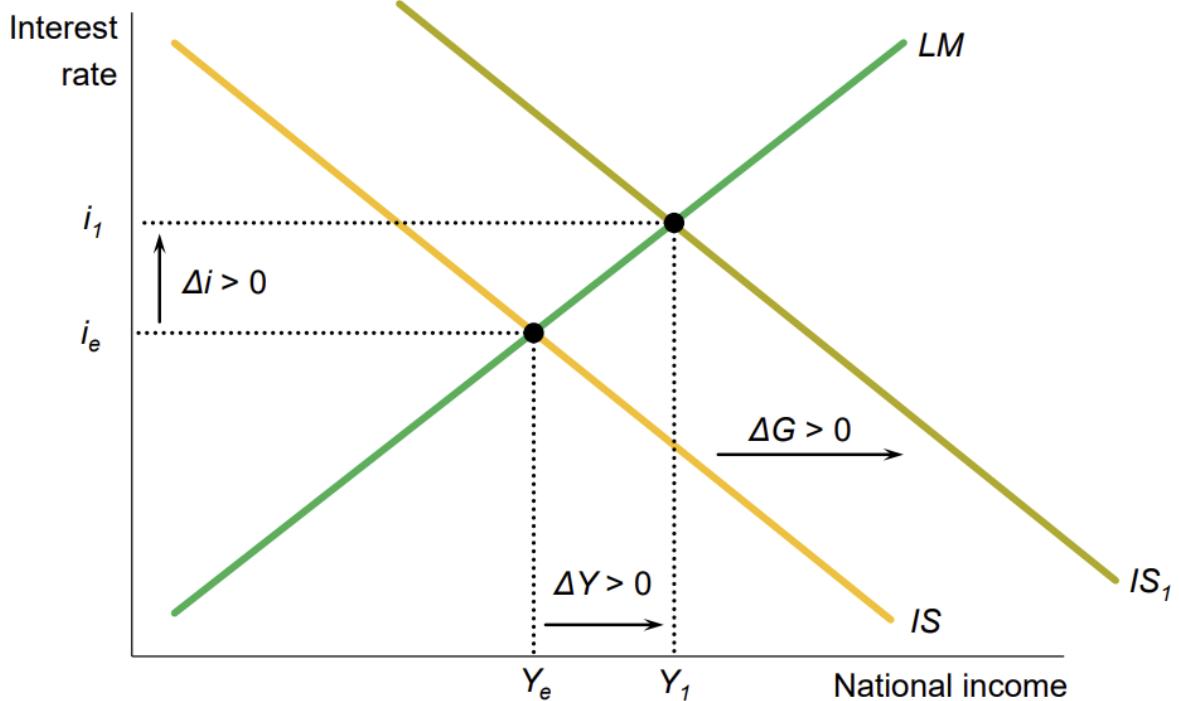
Equilibrium in the IS-LM model is found where the IS curve intersects the LM curve. At this point both the goods market and the money market are in equilibrium at a particular interest rate i_e and level of national income Y_e . Hence it follows that at this point planned expenditure equals actual expenditure ($E = Y$) and the demand for money equals the supply of money $D_m = M_s$.



General Equilibrium Using the IS-LM Model

12.4.1 The Effect of a Change in Fiscal Policy

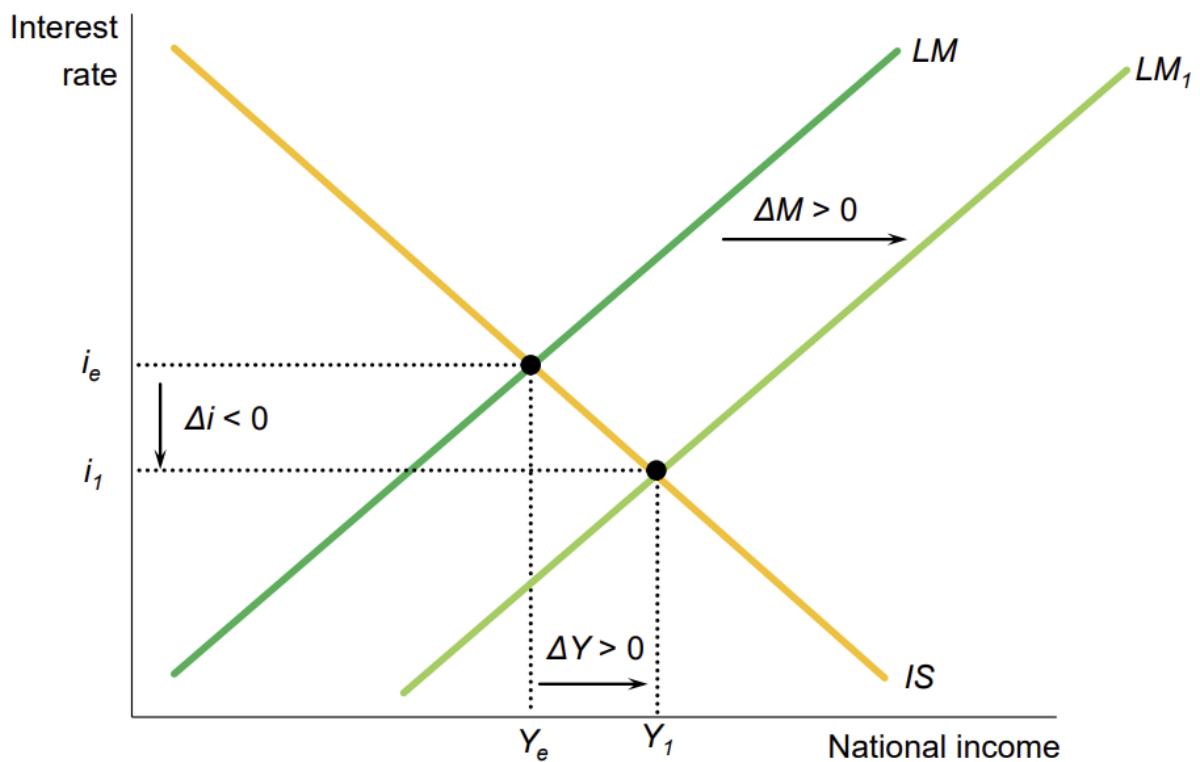
Suppose the government chooses to increase its spending to boost economic activity. This increase in autonomous expenditure shifts the IS to the right. There will be an increase in national income but also an increase in interest rates.



A rise in government spending shift the IS curve to the right resulting in a new equilibrium with a higher interest rate and level of national income.

12.4.2 The Effect of a Change in Monetary Policy

The central bank decides to expand the money supply. The LM curve will shift to the right to LM_1 . The new equilibrium would lead to a lower interest rate and a higher level of national income. The reverse outcome would occur if the central bank tightened monetary policy by reducing the money supply.



In reality, central banks do not act totally in isolation of government even if they are independent. Central banks monitor fiscal policy to see what effects they might have on inflationary pressures in the economy. Suppose the government reduces taxation to boost economic activity. The IS curve will shift to the right and both national income and interest rates will rise. If the central bank wants to keep interest rates constant then it must expand the money supply and so shift the LM curve to the right.

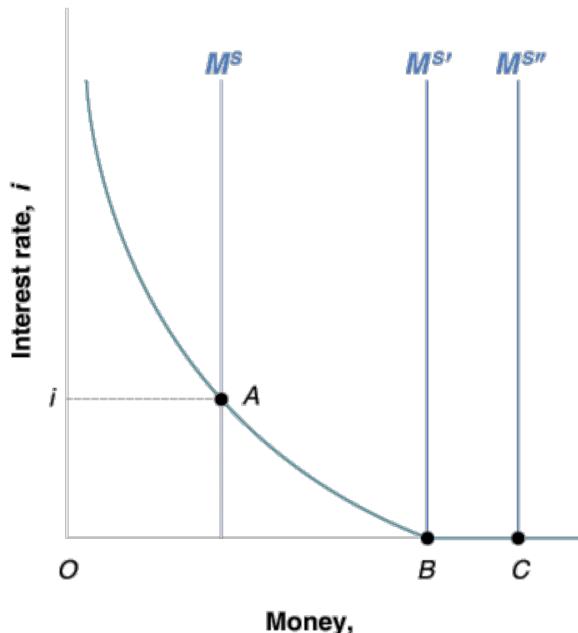
12.4.3 The Liquidity Trap

When the nominal interest rate is zero, and people have enough money for transaction purposes, they become indifferent between holding money and holding bonds as the return is the same (i.e. 0). The demand for money becomes horizontal. Increases in money supply do not effect the nominal interest rate.

Consider the effects of an increase in money supply: Starting from an equilibrium at point A. An increase in the money supply leads to a lower interest rate. Now consider the case where the money supply is at B. An increase in money supply has no effect on the interest rate. As the interest rate becomes equal to zero, people want to hold an amount of money at least equal to the distance OB, which is what they need for transaction purposes.

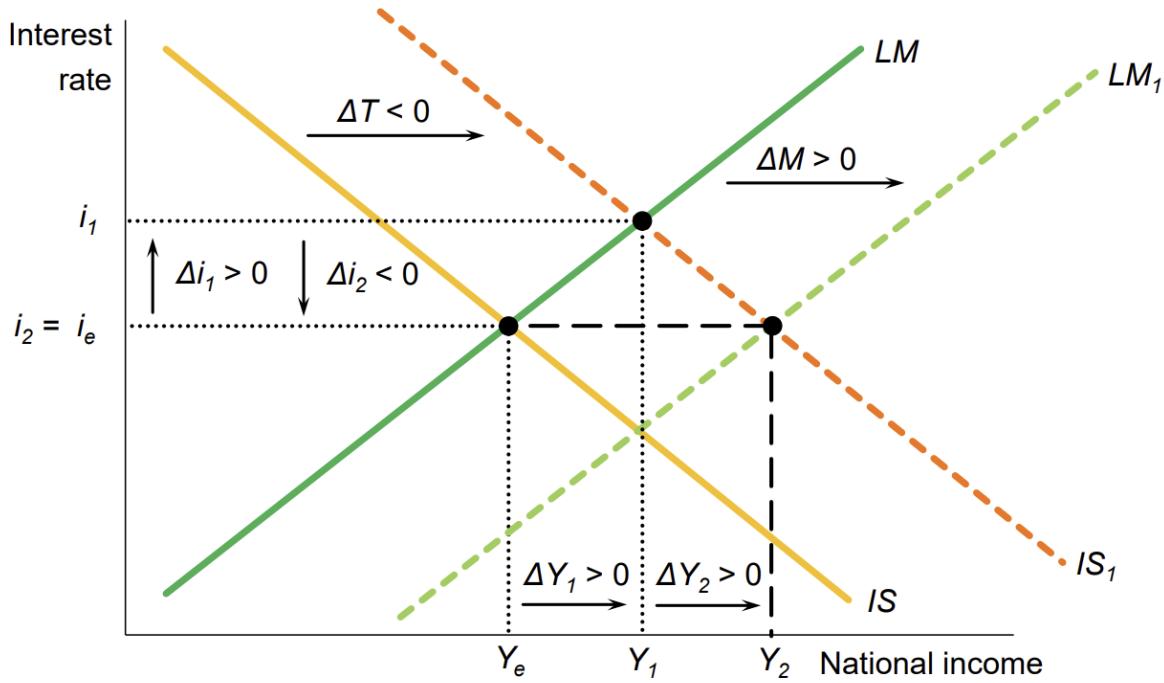
In the presence of a liquidity trap, there is a limit to how much monetary policy can increase output.

Monetary policy may not be able to increase output back to its natural level.

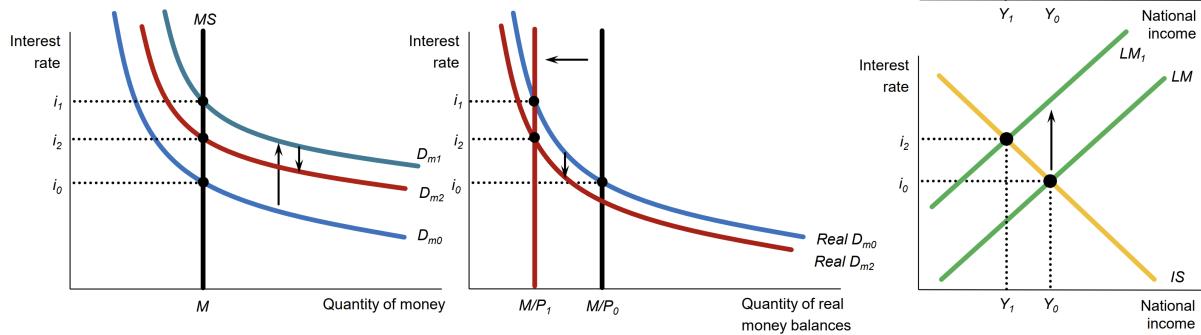


12.5 General Equilibrium

A shift in the IS curve to the right (from IS to IS_1) would, without central bank action, lead to a rise in the interest rate and in national income. If the central bank wants to maintain the interest rate, it must increase the money supply and shift the LM curve to the right. The result would be to maintain the interest rate at i_e , but the increase in national income would be greater than if the central bank had not acted.



1. A rise in the price level reduces real money balances and shifts the LM curve to the left
 - This raises the equilibrium interest rate and lowers national income
2. The aggregate demand curve AD shows the inverse relationship between the price level and national income



12.6 From IS-LM to Aggregate Demand

It is a small step from the IS-LM model to the aggregate demand and aggregate supply model. Aggregate demand shows the relationship between national income and the price level. Note that we have so far assumed prices to be stable/constant/sticky. Hence, P was fixed. We have therefore been referring to the real money supply – what money can actually buy.

Real money supply (M/P) is given by M (nominal money supply) divided by P , the price level.

$$\text{Real money supply} = \frac{\text{nominal money supply}}{\text{Price level}} = \frac{M}{P}$$

A rise in P causes a fall in M/P , shifting the LM curve to the left.

The result is that national income falls and interest rates rise. Hence, higher P lowers aggregate demand.

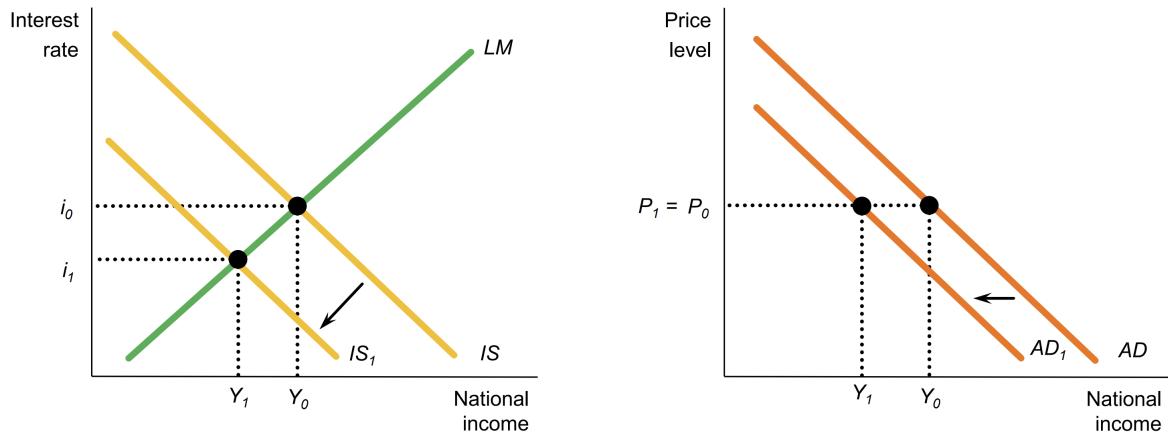
Rise in the price level (P) \Rightarrow LM curve shift to the left \Rightarrow National income falls and interest rate rises

Assume the price level remains constant, then a change in national income in the IS-LM model will result in a shift in the aggregate demand curve.

For example: Austerity measure of tightening fiscal policy causes a fall in national income as aggregate demand shifts inwards. Central bank loosens money supply, e.g. through quantitative easing, boosts national income as aggregate demand shifts outwards.

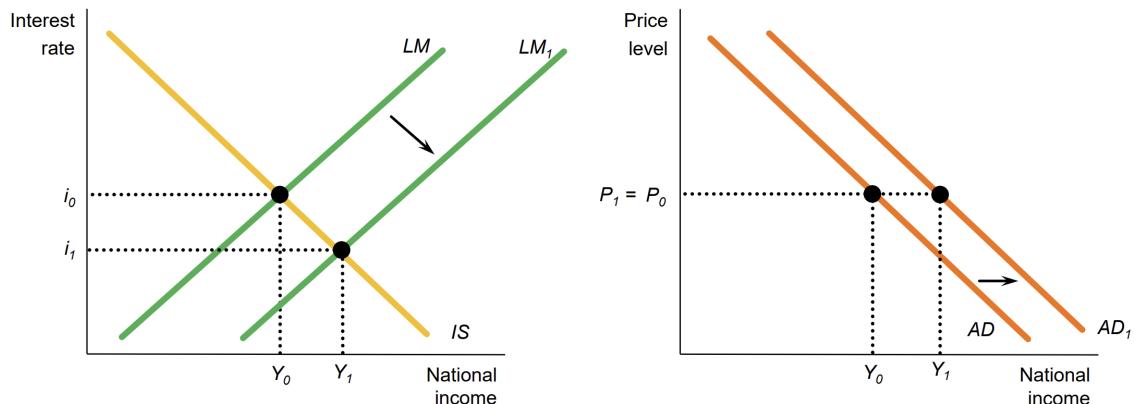
12.7 A Government Tightening Fiscal Policy

In the short term, tightened fiscal policy reduces national income and the economy's interest rate, but the price level (is assumed to) remain(s) constant.



12.8 Central Bank Loosens Monetary Policy

In the short term, expansive monetary policy increases national income and reduces the economy's interest rate, but the price level (is assumed to) remain(s) constant.



12.9 A Return to Keynesianism?

The severity of the global recession, the euro crisis and the Corona pandemic has lead to calls for fiscal stimulation especially as monetary policy has failed to stimulate growth. Two views:

- To raise the money governments will either have to tax its citizens more or increase borrowing and therefore crowding out private investment
- The depth of some of these economic crises was/is such that a fiscal stimulus was/is necessary to get out of a liquidity trap and, far from crowding out, fiscal stimuli would lead to 'crowding in'

▼ Summary of the Chapter

- J.M. Keynes's primary message was that recessions and depressions can occur because of inadequate aggregate demand.
- He advocated governments intervene to boost demand through influencing aggregate demand.
- The Keynesian cross diagram shows how the economy can be in equilibrium when $E = Y$.
- This equilibrium may not be sufficient to deliver full employment output and so the government can attempt to boost demand to help achieve full employment.
- John Hicks developed Keynes's ideas in the form of the IS-LM model which shows general equilibrium in the economy.
- The IS (investment–saving) curve shows all points of equilibrium in the goods market at a particular interest rate and level of national income.
- The LM (liquidity–money supply) curve shows points where the money market is in equilibrium at particular rates of interest and level of national income.
- General equilibrium occurs where the IS curve intersects the LM curve. At this interest rate and level of national income both the goods market and money market are in equilibrium.
- Fiscal policy and monetary policy can cause shifts in the IS and LM curves bringing about new equilibrium positions. The outcome will depend on a variety of factors, including the response of consumption and investment to changes in interest rates and the public's response to holding monetary balances as a result of a change in interest rates.
- From the IS-LM model we can derive the aggregate demand curve that represents the relationship between national income and the price level.
- The IS-LM model has been developed to incorporate change in the way policy is conducted, with more focus on inflation targeting.

13. Monetary and Fiscal Policy

13.1 Explaining Short-Run Economic Fluctuations

The Assumptions of Classical Economics: Most economists believe that classical theory describes the world in the long run, but not in the short run. Changes in the money supply affect nominal variables but not real variables in the long run. The assumption of monetary neutrality is not appropriate when studying year-to-year changes in the economy.

Neutrality of money: If the quantity of money in the economy were to double, prices would double and so would (nominal) incomes. Real variables would remain constant. HOWEVER: These changes will not occur instantaneously. It takes time for prices and incomes to change, and in the meantime, there can be real effects.

13.1.1 The Model of Aggregate Demand and Aggregate Supply

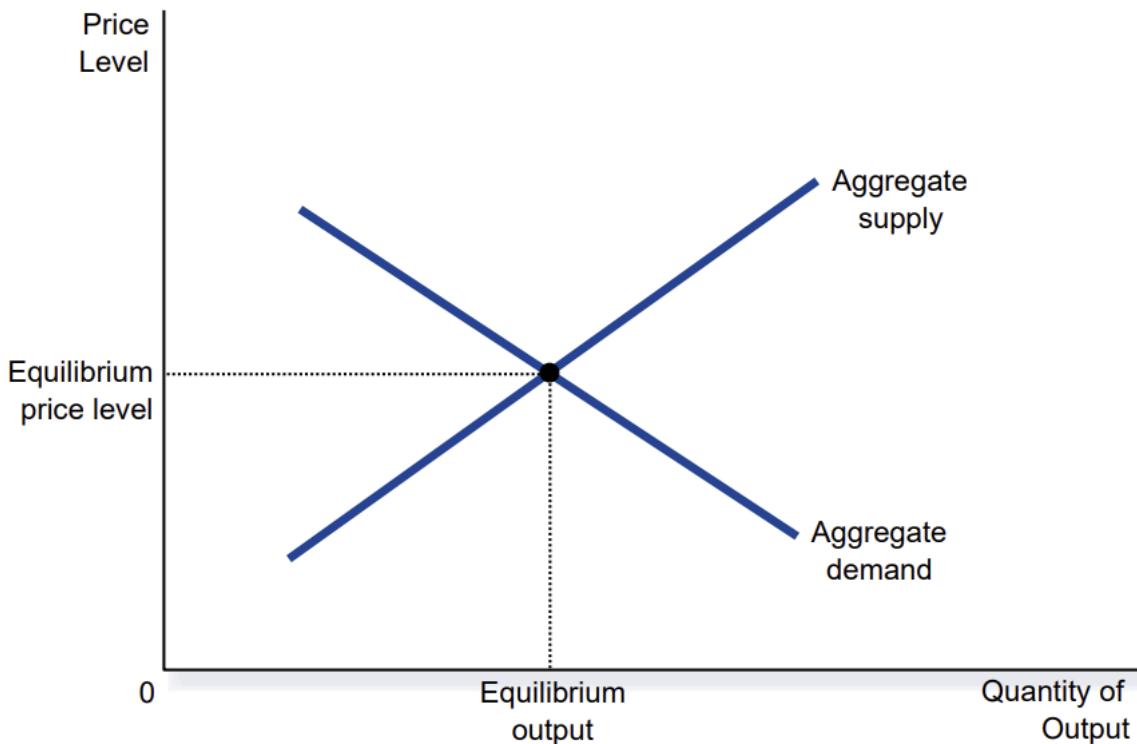
Two variables are used to develop a model to analyze the short-run fluctuations:

- The economy's output of goods and services measured by real GDP
- The average level of prices measured by the CPI or the GDP deflator

Economist use the **model of aggregate demand and aggregate supply** to explain short-run fluctuations in economic activity around its long-run trend.

The **aggregate-demand curve** shows the quantity of goods and services that households, firms, and the government want to buy at each price level.

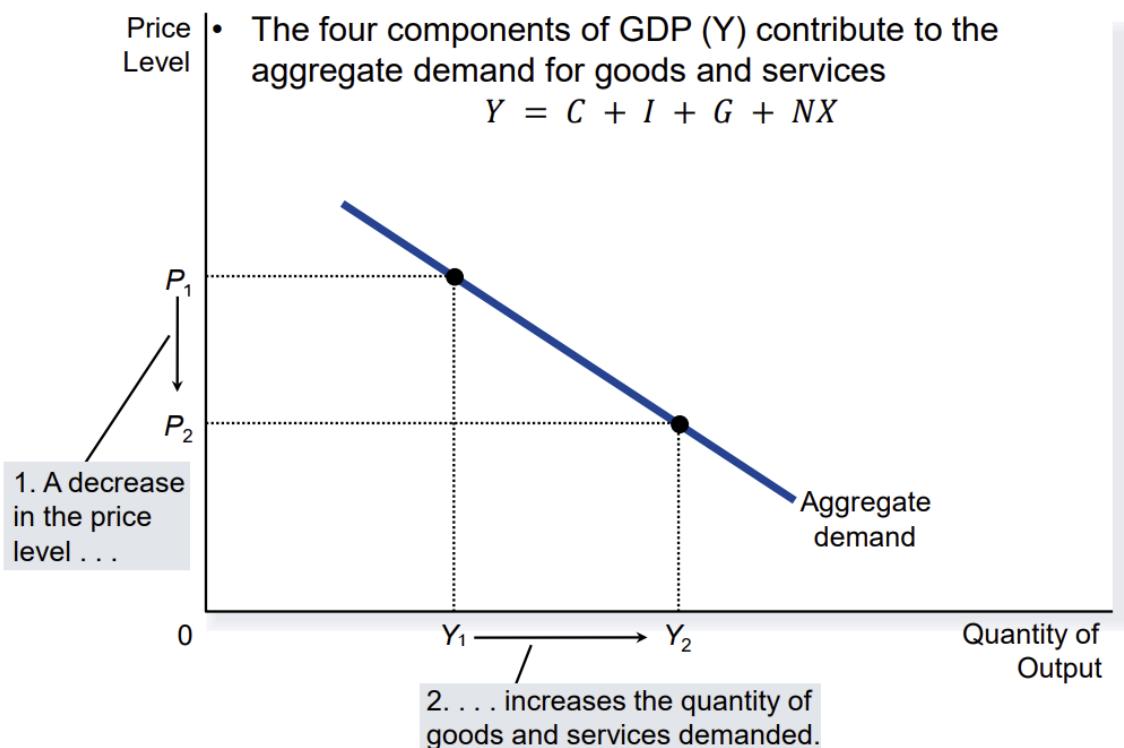
The **aggregate-supply curve** shows the quantity of goods and services that firms choose to produce and sell at each price level.



Economist use the model of AD and AS to analyze economic fluctuations. On the vertical axis is the overall level of prices. On the horizontal axis is the economy's total output of goods and services. Output and the price level adjust to the point at which the AS and AD curves intersect.

13.2 The Aggregate-Demand Curve

The AD curve tells us the quantity of all goods and services demanded in the economy at any given price level.



A fall in the price level from P_1 to P_2 increases the quantity of goods and services demanded from Y_1 to Y_2 . There are three reasons for this negative relationship. As the price level falls, real wealth rises, interest rates fall and the exchange rate

depreciates. These effects stimulate spending on consumption, investment and net exports. Increased spending on these components of output means a larger quantity of goods and services demanded.

As the price level falls, real wealth rises, interest rates fall and the exchange rate depreciates \Rightarrow resulting in a higher output

13.2.1 Why the Aggregate-Demand Curve Is Downward Sloping

The level of AD is determined by the sum of consumption (C), investment (I), government purchases (G) and net exports (NX). For now, we assume government spending is fixed. So we look at the other three components:

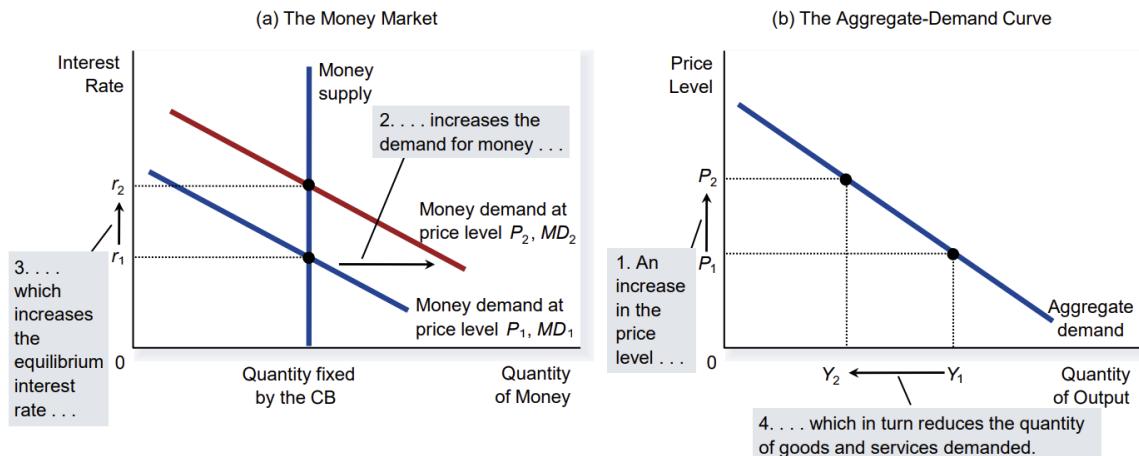
1. The Price Level and Consumption: The Wealth Effect

A decrease in the price level makes consumers feel more wealthy, which in turn encourages them to spend more. This increase in consumer spending means larger quantities of goods and services demanded.

2. The Price Level and Investment: The Interest Rate Effect

A higher price level implies:

- Buying goods and services requires more money
- At given interest rate the demand for money increases
- Given the amount of money in circulation, the price of holding money needs to increase, i.e. the interest rate goes up.



The Money Market and the Slope of the Aggregate Demand Curve (link price level – interest rate)

The Interest Rate Effect: A higher price level increases the (real) interest rate and makes borrowing more expensive, which discourages spending on investment goods. This decrease in investment spending means a smaller quantity of goods and services demanded.

3. The Price Level and Net Exports: The Exchange-Rate Effect

The Exchange-Rate Effect: A lower price level in Switzerland causes (Swiss interest rates to fall and) the real exchange rate to depreciate, which stimulates Swiss net exports. The increase in net export spending means a larger quantity of goods and services demanded.

13.2.2 Why the Aggregate-Demand Curve Is Downward Sloping Conclusion

We conclude: There are three distinct reasons why a fall in the price level increases the quantity of goods and services demanded:

The wealth effect

A higher price level decreases the real value of money and makes consumers less wealthy, which discourages them to spend more. This decrease in consumer

The interest-rate effect

A higher price level increases the real interest rate and makes borrowing more expensive, which discourages spending on

The exchange-rate effect

A higher price level in Switzerland causes (Swiss interest rates to rise and) the real exchange rate to appreciate, which depresses Swiss net exports. The decrease

spending means smaller quantities of goods and services demanded.

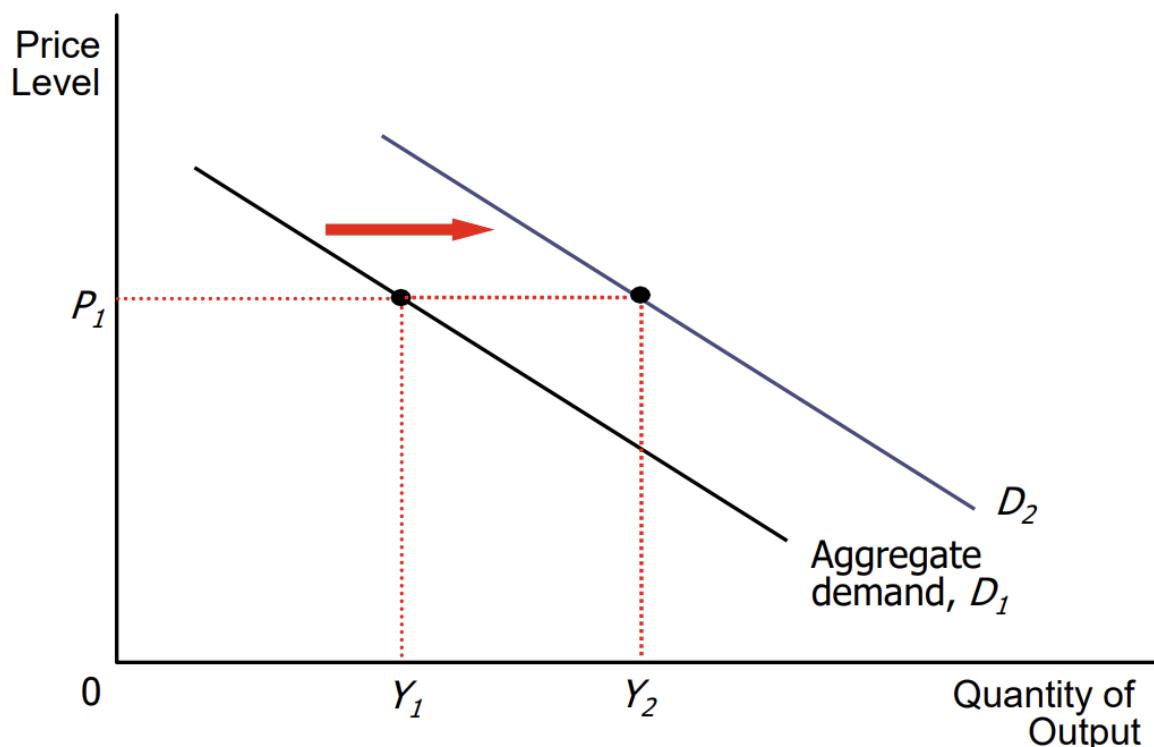
investment goods. This decrease in investment spending means a smaller quantity of goods and services demanded.

in net export spending means a smaller quantity of goods and services demanded.

13.2.2 Why the Aggregate-Demand Curve Might Shift

The downward slope of the aggregate-demand curve shows that a fall in the price level raises the overall quantity of goods and services demanded. Many other factors also affect the quantity of goods and services demanded at any given price level. When one of these other factors changes, the aggregate demand curve shifts. Shifts might arise from changes in:

- (autonomous) Consumption
- (autonomous) Investment
- Government Purchases
- (autonomous) Net Exports
- Money Supply



13.3 The Aggregate-Supply Curve

The AS curve tells us the total quantity of goods and services that firms produce and sell at any given price level.

In the long run, the aggregate-supply curve is vertical because the price level does not affect long run determinants of real GDP.

Why? In the long run, an economy's production of goods and services depends on its supplies of labour, capital, and natural resources and on the available technology used to turn these factors of production into goods and services. The price level does not affect these variables in the long run. The long-run aggregate supply represents the classical dichotomy and money neutrality.

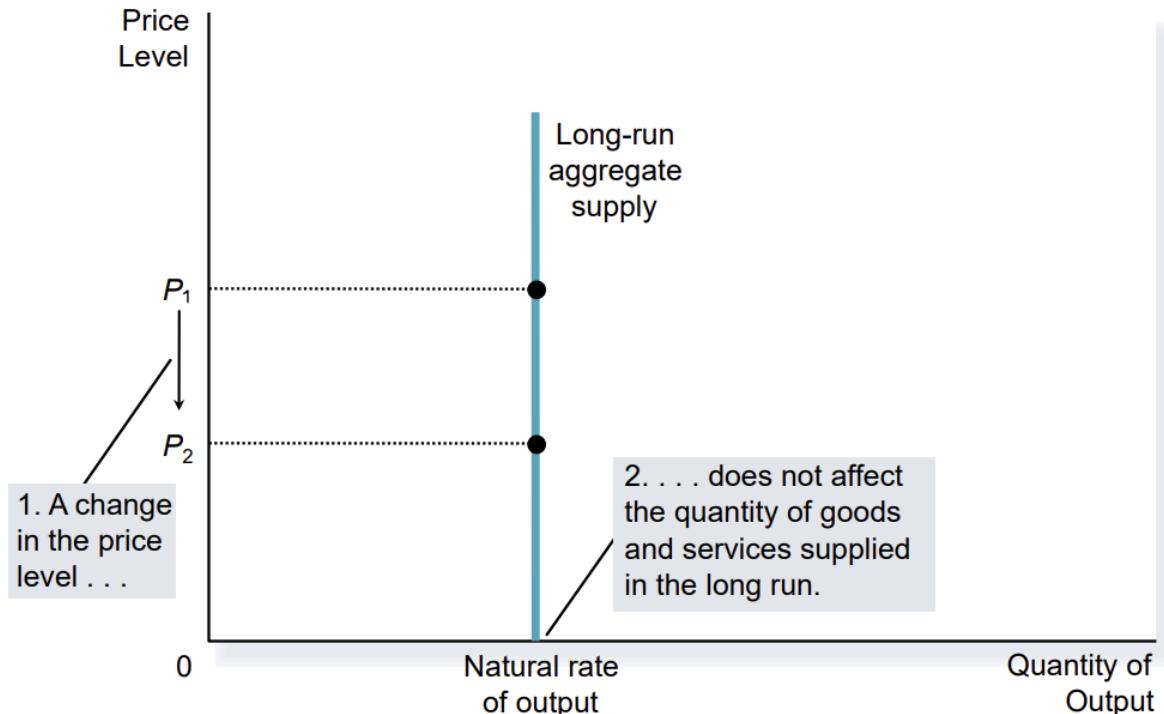
The long-run aggregate-supply curve is vertical at the natural rate of output, which is the production of goods and services that an economy achieves in the long run when unemployment is at its normal rate. This level of production is also referred to as

potential output or full-employment output. The natural rate of output is the level of output towards which the economy gravitates in the long run.

In the short run, the aggregate-supply curve is upward sloping. In the extreme short run (IS/LM model) it is even horizontal (P is given/fixed/constant).

13.3.1 The Long-Run Aggregate-Supply Curve

In the long run, the quantity of output supplied depends on the economy's quantities of labour, capital and natural resources and on technology for turning these inputs into output. The quantity supplied does not depend on the overall price level. As a result, the long-run AS curve is vertical at the natural rate of output.



13.3.2 Why the Long-Run Aggregate-Supply Curve Might Shift

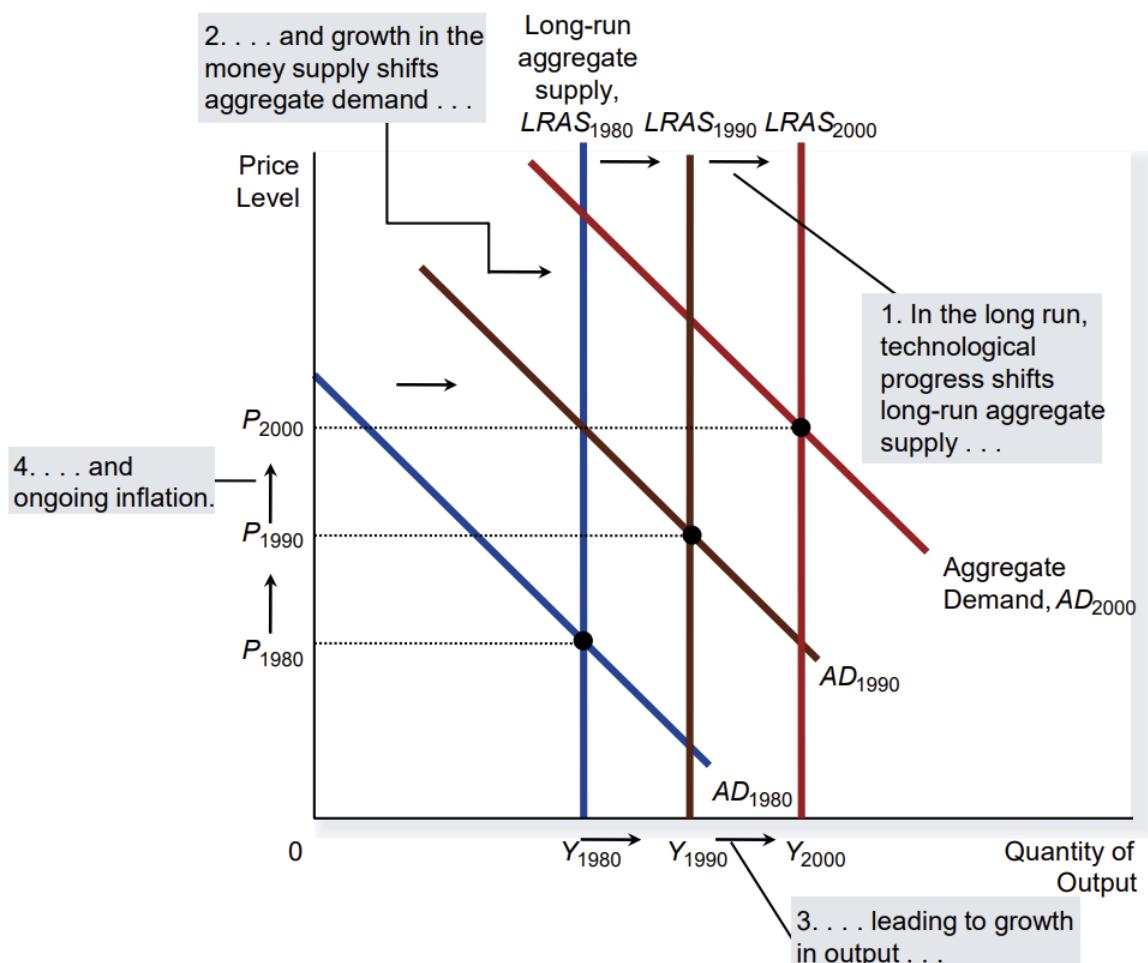
Any change in the economy that alters the natural rate of output shifts the long-run aggregate-supply curve. The shifts may be categorized according to the various factors in the classical model that affect output. Shifts might arise from changes in:

- Labour (e.g. net immigration)
- Technological Knowledge (i.e. inventions of new technology)
- Natural Resources
- Capital

The LRAS (Long-run aggregate supply) curve reflects the classical model of the economy. Any policy or event that raised real GDP can now be viewed as increasing the quantity of goods and services supplied and shifting the LRAS curve to the right. Any policy or event that lowered real GDP can now be viewed as decreasing the quantity of goods and services supplied and shifting the LRAS curve to the left.

13.3.3 Long-Run Growth and Inflation

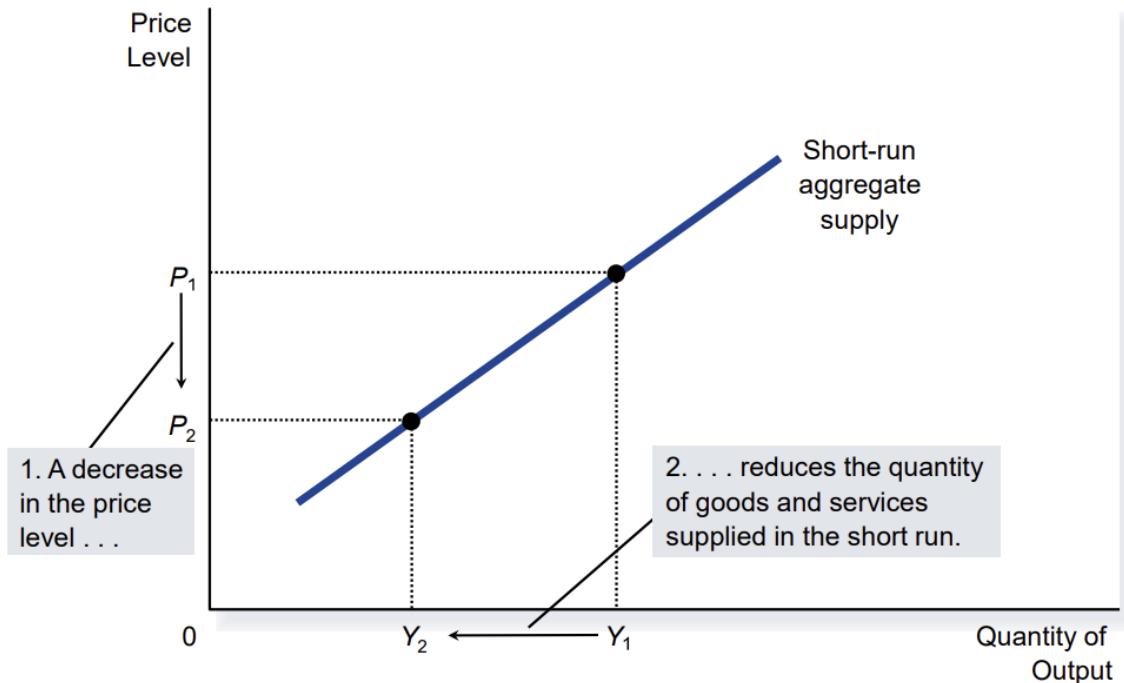
As the economy becomes better able to produce goods and services over time, primarily because of technological progress, the LRAS curve shifts to the right. At the same time, as the central bank increases money supply, the AD curve also shifts to the right. In this figure, output grows from Y_{1980} to Y_{1990} and then to Y_{2000} , and the price level rises from P_t , to P_{t+10} and then to P_{t+20} . Thus the model of AD and AS offers a new way to describe the classical analysis of growth and inflation.



The most important forces that govern the economy in the long run are technology (output) and monetary policy (price level). Short-run fluctuations in output and the price level should be viewed as deviations from the continuing long-run trends of output growth and inflation.

13.3.4 Why the Aggregate-Supply Curve Slopes Upward in the Short Run

In the short run, an increase in the overall level of prices in the economy tends to raise the quantity of goods and services supplied. A decrease in the level of prices tends to reduce the quantity of goods and services supplied. As a result, the short-run aggregate-supply curve is upward sloping.



In the short run, a fall in the price level from P_1 to P_2 reduces the quantity of output supplied from Y_1 to Y_2 . This positive relationship could be due to sticky wages, sticky prices or misperceptions. Over time, wages, prices and perceptions adjust, so this positive relationship is only temporary.

13.3.4 Three Theories to Explain Why the Aggregate-Supply Curve Slopes Upward in the Short Run

1. The Sticky-Wage Theory

Nominal wages are slow to adjust to changing economic conditions, or are “sticky” in the short run. A lower price level makes employment and production less profitable. This induces firms to reduce the quantity of goods and services supplied.

2. The Sticky-Price Theory

Prices of some goods and services adjust sluggishly in response to changing economic conditions. An unexpected fall in the price level leaves some firms with higher-than-desired prices. For a variety of reasons, they may not want to or be able to change prices immediately. This depresses (expected) sales, inducing firms to reduce the quantity they produce.

3. The Misperceptions Theory

Changes in the overall price level temporarily mislead suppliers about what is happening in the markets in which they sell their output. A lower price level causes misperceptions about relative prices. These misperceptions induce suppliers to decrease the quantity of goods and services supplied.

All these theories suggest that output deviates in the short run from the natural rate when the actual price level deviates from the price level that people had expected to prevail:

$$\text{Quantity of output supplied} = \text{Natural rate of output} + \alpha \cdot (\text{Actual price level} - \text{Expected Price level})$$

$$Y = \hat{Y} + \alpha \cdot (P - P^e)$$

13.3.5 Why the Short-Run Aggregate-Supply Curve Might Shift

Events that shift the long-run aggregate supply curve will shift the short-run aggregate supply curve as well

- Labour
- Capital
- Natural Resources
- Technology

People's expectations of the price level will affect the position of the short-run aggregate supply curve even though it has no effect on the long-run aggregate supply curve. An increase in the expected price level reduces the quantity of goods and

services supplied and shifts the short-run aggregate supply curve to the left. A decrease in the expected price level raises the quantity of goods and services supplied and shifts the short-run aggregate supply curve to the right.

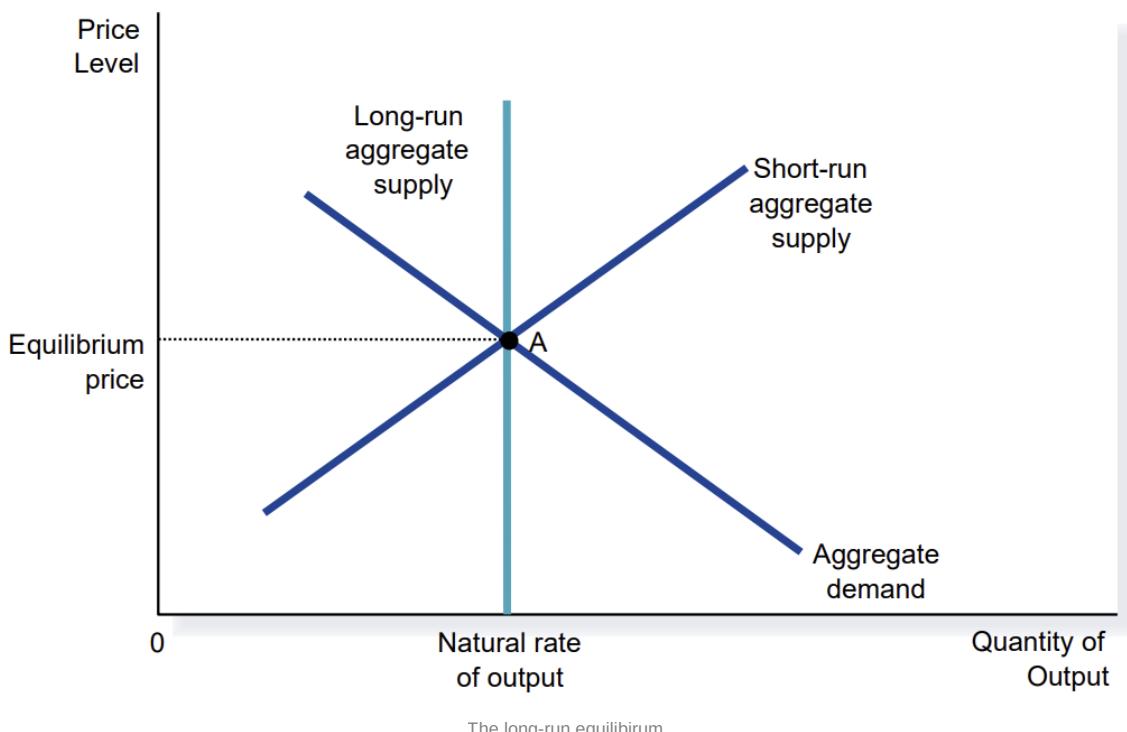
13.4 Causes of economic fluctuations

Our model of AD and AS provides the tools to analyze two basic causes of short-run fluctuations.

We assume, that the economy begins in a long run equilibrium.

13.4.1 The Long-run Equilibrium

The long-run equilibrium of the economy is found where AD curve crosses the LRAS curve (Point A). When the economy reaches this long-run equilibrium, wages, prices and perceptions will have adjusted so that the SRAS curve crosses this point as well.



13.4.2 Analysing economic fluctuations: the AD/AS Model

Aggregate demand is given by:

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

And short-run aggregate supply is given by:

$$Y = \hat{Y} + \alpha \cdot (P - P^e)$$

Four steps in the process of analysing economic fluctuations:

1. Determine whether the event affects aggregate supply or aggregate demand
2. Decide which direction the curve shifts
3. Use a diagram to compare the initial and the new equilibrium
4. Keep track of the short and long run equilibrium, and the transition between them

13.4.3 The Two Causes of Economic Fluctuations

1. Shifts in Aggregate Demand

In the short run, shifts in aggregate demand cause fluctuations in the economy's output of goods and services. In the long

run, shifts in aggregate demand affect the overall price level but do not affect output. Policymakers who influence aggregate demand can potentially mitigate the severity of economic fluctuations.

2. Shifts in Aggregate Supply

A decrease in one of the determinants of aggregate supply shifts the curve to the left: Output falls below the natural rate of employment. Unemployment rises. The price level rises

13.5 Shifts in Aggregate Demand

In the short run, shifts in aggregate demand cause fluctuations in the economy's output of goods and services. In the long run, shifts in aggregate demand affect the overall price level but do not affect output.

Policymakers who influence aggregate demand can potentially mitigate the severity of economic fluctuations.

13.5.1 The Influence of Monetary and Fiscal Policy on Aggregate Demand

Many factors influence aggregate demand besides monetary and fiscal policy. In particular, desired spending by households and business firms determines the overall demand for goods and services.

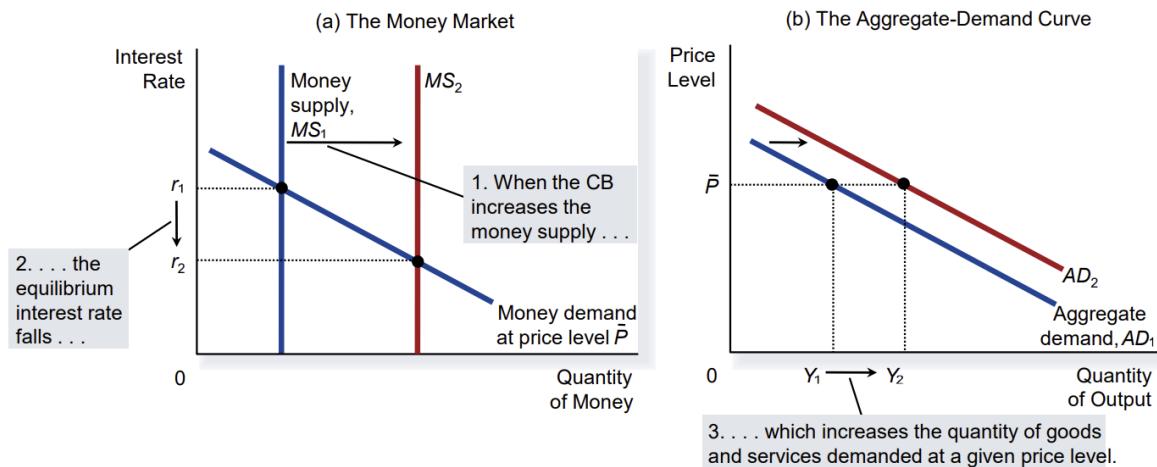
When desired spending changes, aggregate demand shifts, causing short-run fluctuations in output and employment.

Monetary and **fiscal policy** are sometimes used to offset those shifts and stabilize the economy.

13.5.2 Monetary Policy: Changes in the Money Supply

The Central Bank can shift the aggregate demand curve when it changes monetary policy. An increase in the money supply shifts the money supply curve to the right. Without a change in the position of the money demand curve, the interest rate falls. Falling interest rates increase the quantity of goods and services demanded.

When the Central Bank increases the money supply, it lowers the interest rate and increases the quantity of goods and services demanded at any given price level, shifting aggregate-demand to the right. When the Central Bank decreases the money supply, it raises the interest rate and reduces the quantity of goods and services demanded at any given price level, shifting aggregate-demand to the left.



13.5.3 The Role of Interest-Rate Targets in Central Bank Policy

Monetary policy can be described either in terms of the money supply or in terms of the interest rate. Changes in monetary policy can be viewed either in terms of a changing target for the interest rate or in terms of a change in the money supply. A target for the federal funds rate affects the money market equilibrium, which influences aggregate demand.

13.5.4 How Fiscal Policy Influences Aggregate Demand

Fiscal policy refers to the government's choices regarding the overall level of government purchases or taxes

Fiscal policy influences saving, investment, and growth in the long run. In the short run, fiscal policy primarily affects the aggregate demand.

When policymakers change the money supply (M) or taxes (T), the effect on aggregate demand is indirect — through the spending decisions of firms or households. When the government alters its own purchases of goods or services (G), it shifts the aggregate-demand curve directly (as it is part of the national income account identity). There are two (3) macroeconomic effects from a change in government purchases (or taxes):

1. The multiplier effect
2. The crowding-out effect
3. (Ricardian equivalence: People anticipate future tax changes and change own savings accordingly)

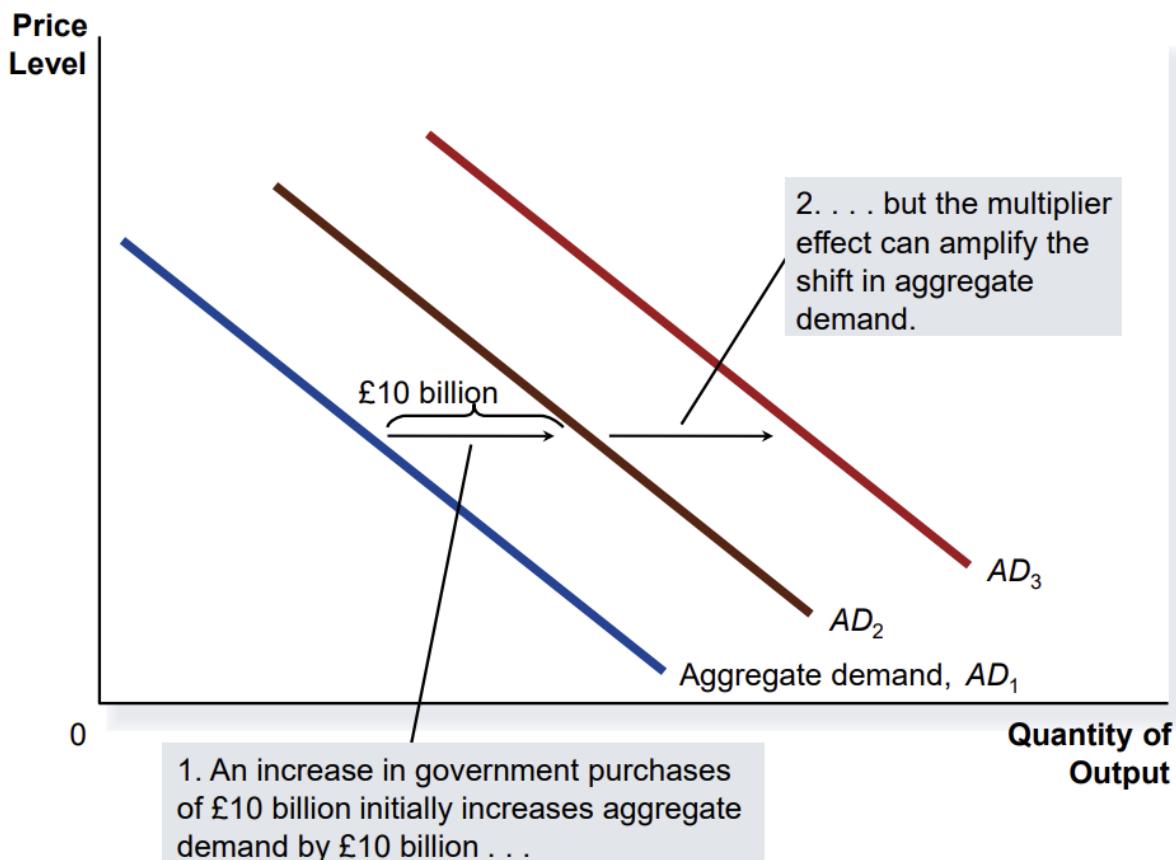
Now we take a closer look at this effects...

13.5.5 Changes in Government Purchases: Multiplier Effect

Government purchases are said to have a multiplier effect on aggregate demand. Each pound spent by the government can raise the aggregate demand for goods and services by more than a pound.

The multiplier effect refers to the additional shifts in aggregate demand that result when expansionary fiscal policy increases income and thereby increases consumer spending.

$$\text{Multiplier} = \frac{1}{MPS + MPT + MPM} = \frac{1}{MPW}$$

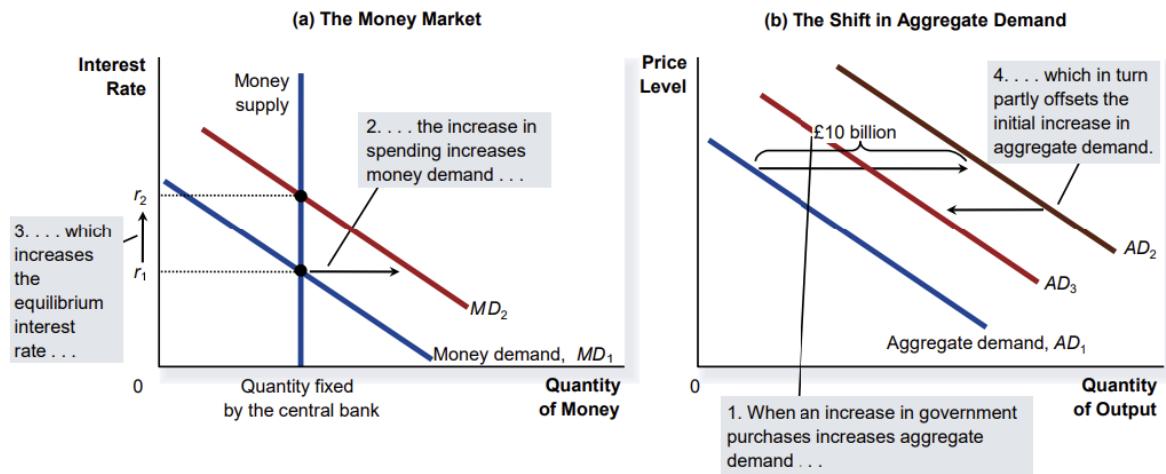


Changes in Government Purchases: Multiplier Effect

13.5.6 Changes in Government Purchases: Crowding-Out Effect

Fiscal policy may not affect the economy as strongly as predicted by the multiplier. An increase in government purchases causes the interest rate to rise. A higher interest rate reduces investment spending. This reduction in demand that results when a fiscal expansion raises the interest rate is called the **crowding-out effect**. The crowding-out effect tends to dampen the effects of fiscal policy on aggregate demand.

When the government increases its purchases by £10 billion, the aggregate demand for goods and services could rise by more or less than £10 billion, depending on whether the multiplier effect or the crowding-out effect is larger.

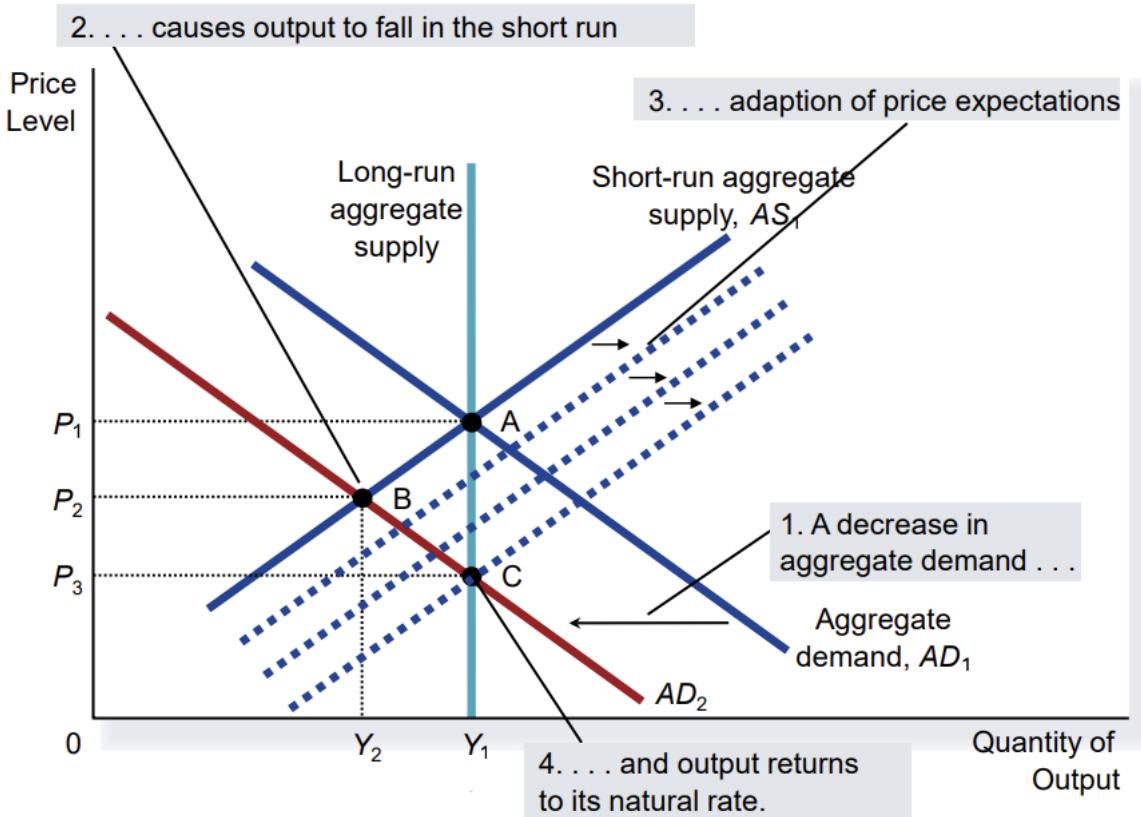


Changes in Government Purchases: Crowding-Out Effect

13.5.7 Changes in Taxes

When the government cuts personal income taxes, it increases households' take-home pay. Households save some of this additional income. Households also spend some of it on consumer goods. Increased household spending shifts the aggregate-demand curve to the right. The size of the shift in aggregate demand resulting from a tax change is affected by the multiplier and crowding-out effects. It is also determined by the households' perceptions about the permanency of the tax change.

13.5.8 A Contraction in Aggregate Demand with Policy Reacting



13.6 A Shift in Aggregate Supply

A decrease in one of the determinants of aggregate supply shifts the curve to the left: Output falls below the natural rate of output, unemployment rises and the price level rises.

Policy Responses to supply-side driven Recession: Policymakers may respond to a recession in one of the following ways:

- Do nothing and wait for prices and wages to adjust
- Take action to increase aggregate demand by using monetary and fiscal policy

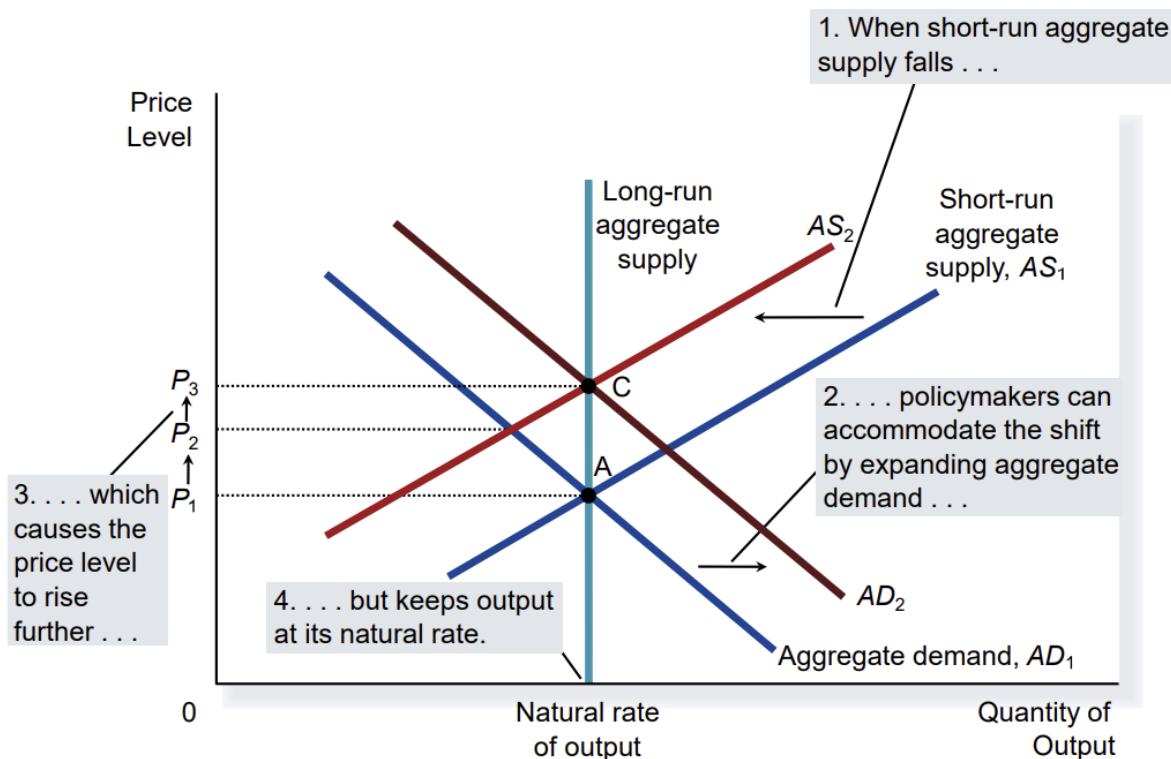
Stagflation: a period of falling output and rising prices

Adverse shifts in aggregate supply cause stagflation—a period of recession and inflation. Output falls and prices rise. Policymakers who can influence aggregate demand cannot offset both of these adverse effects simultaneously.

13.6.1 Accommodating an Adverse Shift in Aggregate Supply

Faced with an adverse shift in AS from AS_1 to AS_2 , policymakers who can influence AD might try to shift the AD curve to the right from AD_1 to AD_2 . The economy would move from point A to Point C. This policy would prevent the supply shift from reducing output in the short run, but the price level would permanently rise from P_1 to P_3 .

Problem: in a supply shock the price increases. The central bank wants to fight against the inflation and wants to shift the demand curve to the left. The government wants to fight against the decreased output (against a recession) and wants to shift the demand curve to the right.



13.7 New Keynesian Economics

From the 1970s economics came to be classified as a debate between:

- Keynesians – markets not clearing quickly
- Neo or new classicists – markets are efficient and argue that microeconomics provided a foundation for understanding macroeconomics

New Keynesian Economics seeks to explain how price and wage stickiness has its foundation in the microeconomic analysis of labour markets and price setting by firms. Changes in nominal variables (like the money supply) have an influence on output and employment – real variables. Imperfections exist in the microeconomy: Firms operate under imperfect competition and Consumers have imperfect knowledge. These rigidities hinder the movement of prices and wages in the macroeconomy. There is a problem in attempting to manipulate demand management due to time lags and doubts on the effectiveness of the interventions.

▼ Summary of the Chapter

- All societies experience short-run economic fluctuations around long-run trends. These fluctuations are irregular and largely unpredictable.
- When recessions occur, real GDP and other measures of income, spending, and production fall, and unemployment rises
- Economists analyse short-run economic fluctuations using the aggregate demand and aggregate supply model. According to the model of aggregate demand and aggregate supply, the output of goods and services and the overall level of prices adjust to balance aggregate demand and aggregate supply
- The aggregate demand curve slopes downward for three reasons: A wealth effect, an interest rate effect, and an exchange rate effect and any event or policy that changes consumption, investment, government purchases, or net exports at a given price level will shift the aggregate demand curve
- In the long run, the aggregate supply curve is vertical
- The short-run, the aggregate supply curve is upward sloping
- Three theories explain the upward slope of short-run aggregate supply: 1. The misperceptions theory, 2. the sticky wage theory, and 3. the sticky price theory. Events that alter the economy's ability to produce will shift the short-run aggregate

supply curve. The position of the short-run aggregate supply curve depends on the expected price level

- One possible cause of economic fluctuations is a shift in aggregate demand
- A second possible cause of economic fluctuations is a shift in aggregate supply
- Stagflation is a period of falling output and rising prices
- Keynes proposed the theory of liquidity preference to explain determinants of the interest rate. According to this theory, the interest rate adjusts to balance the supply and demand for money. An increase in the price level raises money demand and increases the interest rate
- A higher interest rate reduces investment and, thereby, the quantity of goods and services demanded
- The downward-sloping aggregate-demand curve expresses this negative relationship between the price-level and the quantity demanded
- Policymakers can influence aggregate demand with monetary policy: An increase in money supply will ultimately lead to the aggregate-demand curve shifting to the right. A decrease in money supply will ultimately lead to the aggregate-demand curve shifting to the left
- Policymakers can influence aggregate demand with fiscal policy
- Increased government purchases or tax cuts shift the aggregate-demand curve to the right
- Decreased government purchases or tax increases shift the aggregate-demand curve to the left
- When the government alters spending or taxes, the resulting shift in aggregate demand can be larger or smaller than the fiscal change
- The multiplier effect tends to amplify the effects of fiscal policy on aggregate demand. The crowding-out effect tends to dampen the effects of fiscal policy on aggregate demand
- Because monetary and fiscal policy can influence aggregate demand, the government sometimes uses these policy instruments in an attempt to stabilize the economy
- Economists disagree about how active the government should be in this effort: Advocates say that if the government does not respond the result will be undesirable fluctuations. Critics argue that attempts at stabilization often turn out destabilizing the economy instead.

14. Phillips Curve

Recall the Natural Rate of Unemployment:

The **natural rate of unemployment** is unemployment that does not go away on its own even in the long run

There are two reasons why there is a positive natural rate of unemployment:

1. job search (frictional unemployment)
2. wage rigidity (structural unemployment), because of Minimum-wage laws, Unions and Efficiency wages

Recall The Quantity Equation & Classical Dichotomy:

$$\underbrace{M \cdot V}_{\text{Quantity of Money}} = \underbrace{P \cdot Y}_{\text{Nominal value of Output}}$$

relates the quantity of money (M) to the nominal value of output ($P \times Y$).

It shows that an increase in money must be reflected in one of three other variables: (i) the price level must rise, (ii) the quantity of output must rise, or (iii) the velocity of money must fall.

The velocity of money is considered to be (relatively) fixed.

The classical dichotomy states, that real economic variables do not change with changes in money.

⇒ Hence, changes in money supply only affect the price level.

14.1 Short-Run Trade-Off between Inflation and Unemployment

Society faces a short-run trade-off between unemployment and inflation. If policymakers expand aggregate demand, they can lower unemployment, but only at the cost of higher inflation.

If they contract aggregate demand, they can lower inflation, but at the cost of temporarily higher unemployment.

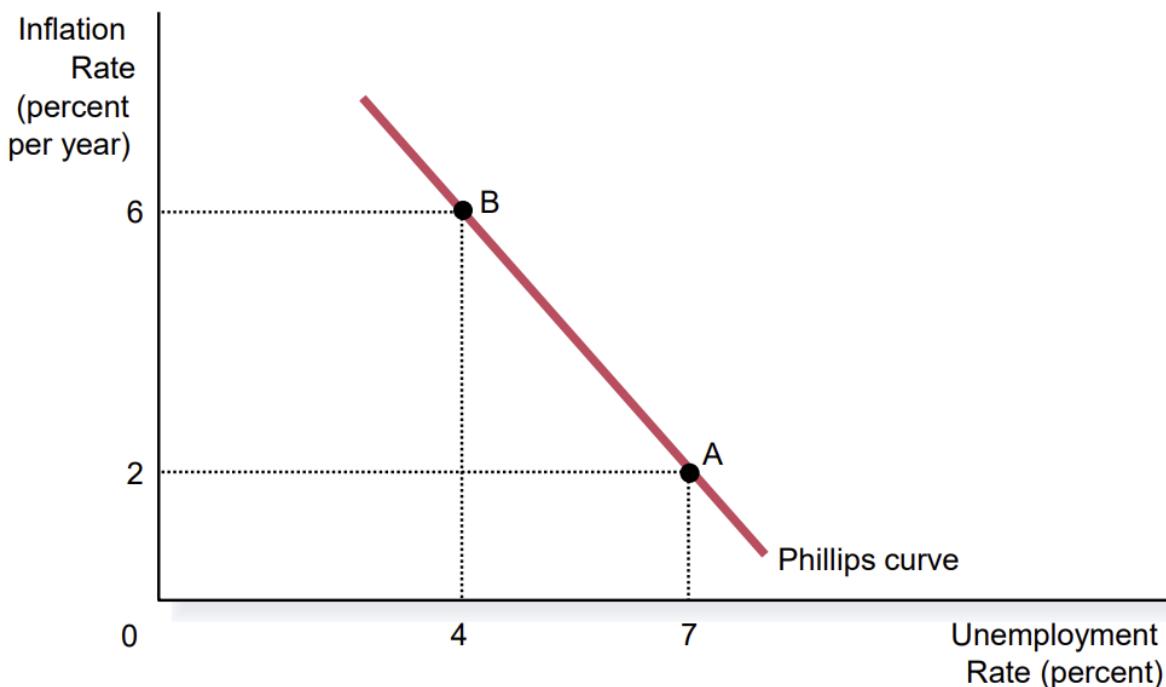
Rise in aggregate demand ⇒ lower Unemployment, but higher inflation

Fall in aggregate demand ⇒ lower inflation, but higher unemployment.

The Phillips curve shows the short-run trade-off between inflation and unemployment.

14.2 The Phillips Curve

The Phillips curve illustrates a negative association between the inflation rate and the unemployment rate. At point A, inflation is low and unemployment is high. At point B, inflation is high and unemployment is low.

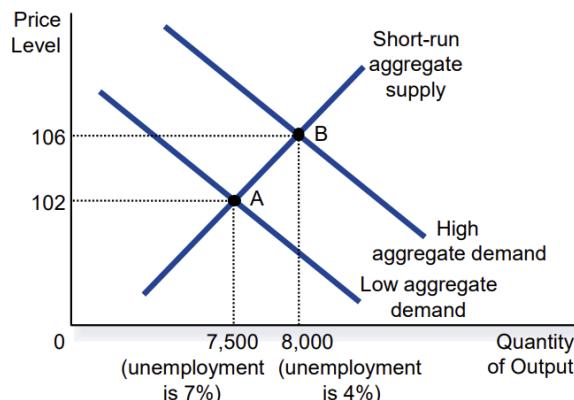


14.2.1 Aggregate Demand, Aggregate Supply and the Phillips Curve

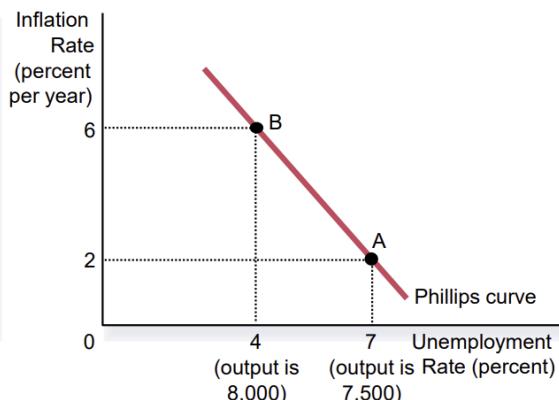
The Phillips curve shows the short-run combinations of unemployment and inflation that arise as shifts in the aggregate demand curve move the economy along the short-run aggregate supply curve.

The greater the aggregate demand for goods and services, the greater is the economy's output, and the higher is the overall price level. A higher level of output results in a lower level of unemployment.

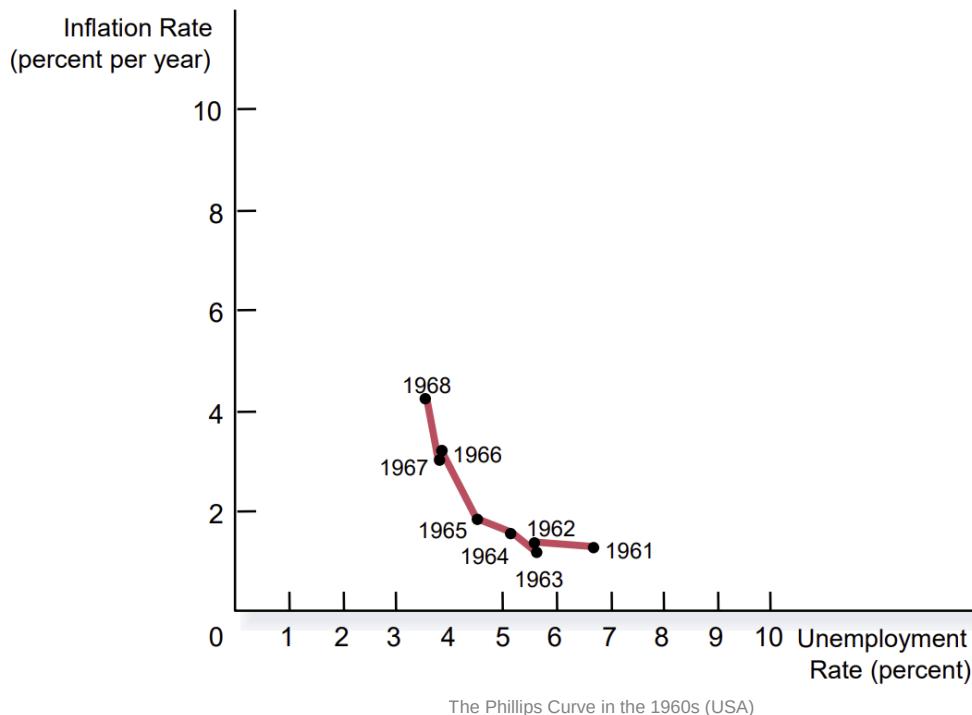
(a) The Model of Aggregate Demand and Aggregate Supply



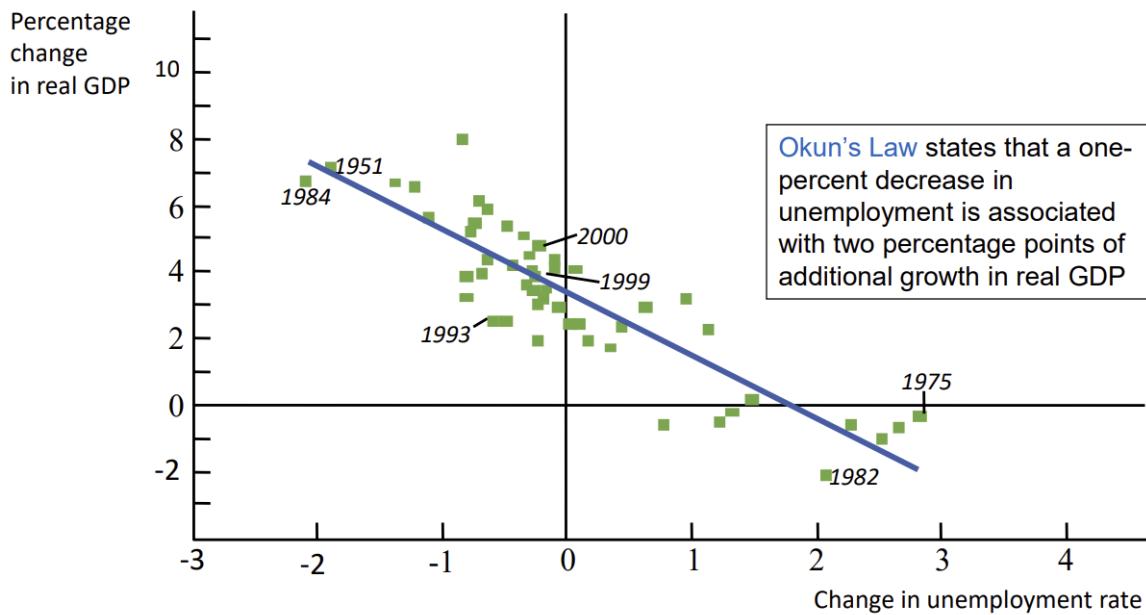
(b) The Phillips Curve



Panel (a) shows the model of the AD and AS. If AD is low, the economy is at point A; output is low (7,500) and the price level is low (102). If AD is high, the economy is at point B; output is high (8,000) and the price level is high (106). Panel (b) shows the implication for the Phillips curve. Point A, which arises when AD is low, has high unemployment (7%) and low inflation (2%). Point B, which arises when AD is high, has low unemployment (4%) and high inflation (6%).



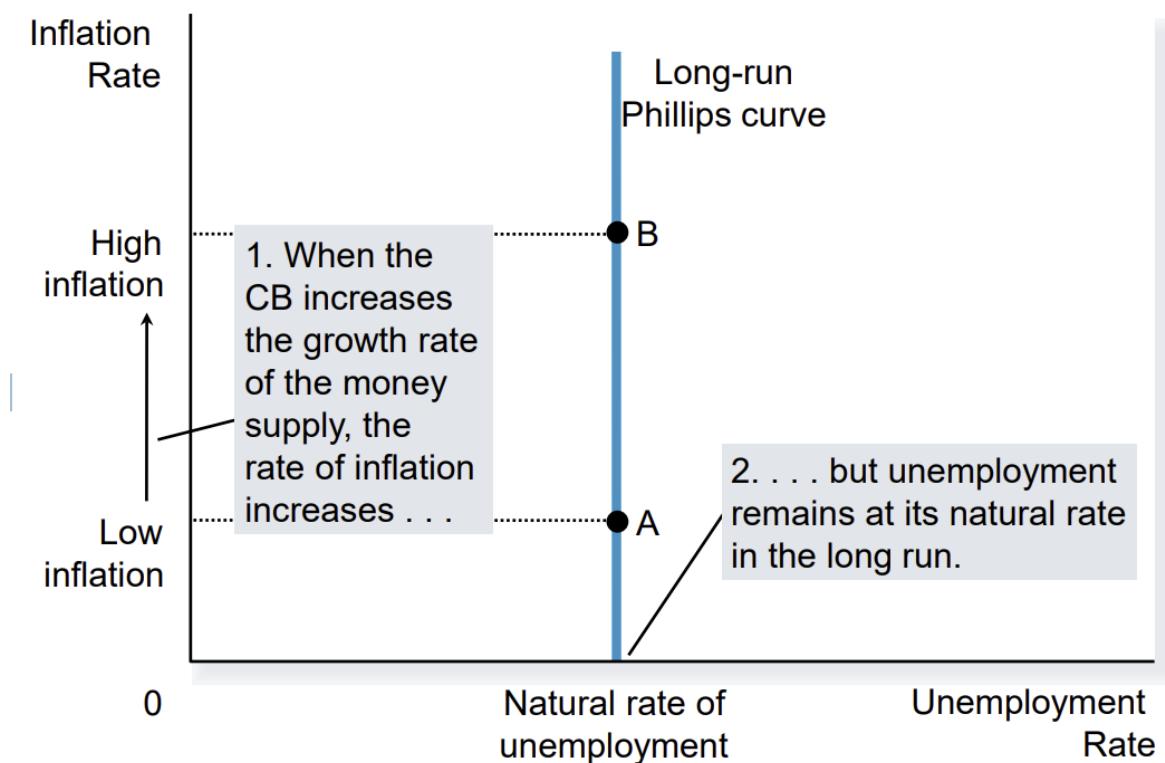
14.2.2 Okun's Law



14.3 Shift in the Phillips curve: The role of expectations

14.3.1 The Long-Run Phillips Curve

The (short-run) Phillips curve seems to offer policymakers a menu of possible inflation and unemployment outcomes. In the 1960s, Friedman and Phelps concluded that inflation and unemployment are unrelated in the long run. As a result, the long-run Phillips curve is vertical at the natural rate of unemployment. Monetary policy could be effective in the short run but not in the long run.



Growth in the money supply determines the inflation rate. Regardless of the inflation rate, the unemployment rate gravitates towards its natural rate. As a result, the long-run Phillips curve is vertical.

14.3.2 The Meaning of “Natural”

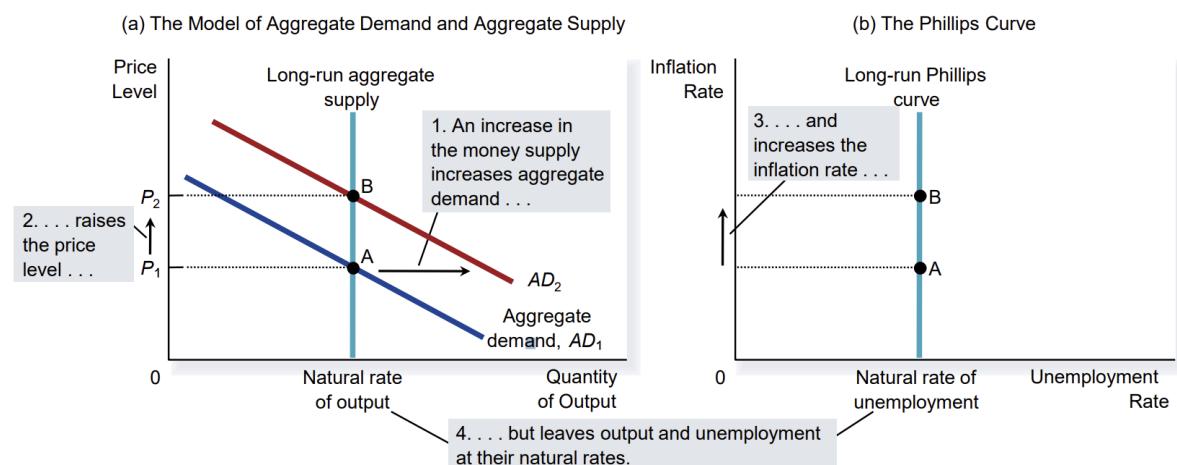
The “natural” rate of unemployment is the rate to which the economy gravitates in the long run. The natural rate is not necessarily desirable, nor is it constant over time.

Monetary policy cannot change the natural rate, but other government policies that strengthen labour markets can.

14.3.3 How the Phillips Curve is Related to Aggregate Demand and Aggregate Supply

Panel (a) shows the model of AD and AS with a vertical AS curve. When expansionary monetary policy shifts the AD curve to the right from AD_1 to AD_2 , the equilibrium moves from point A to point B. The price level rises from P_1 to P_2 , while output remains the same. Panel (b) shows the long-run phillips curve, which is vertical at the natural rate of unemployment.

Expansionary monetary policy moves the economy from lower inflation (point A) to higher inflation (point B) without changing the rate of unemployment.



14.3.4 The Short-Run Phillips Curve

Expected inflation measures how much people expect the overall price level to change.

Over time, expected inflation adjusts to changes in actual inflation. The Central Bank's ability to create unexpected inflation exists only in the short run. Once people anticipate inflation, the only way to get unemployment below the natural rate is for actual inflation to be above the anticipated rate.

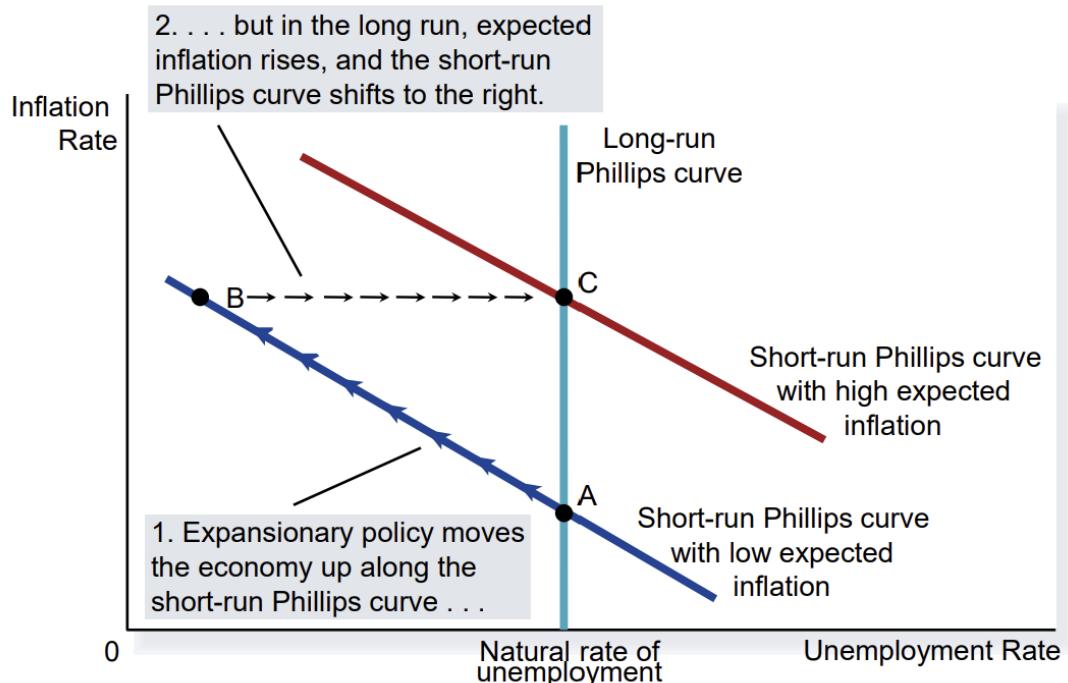
$$\text{Unemployment rate} = NRU - \alpha \cdot (\text{Actual Inflation} - \text{Expected Inflation})$$

This equation relates the unemployment rate to the natural rate of unemployment (NRU), actual inflation and expected inflation. In the short run, expected inflation is given. As a result, higher actual inflation is associated with lower unemployment.

In the long run, however, actual inflation equals expected inflation, and unemployment is at its natural rate.

14.3.5 How Expected Inflation Shifts the Short-Run Phillips Curve

The higher the expected rate of inflation, the higher the short-run trade off between inflation and unemployment. At point A, expected inflation and actual inflation are both low, and unemployment is at its natural rate. If the central bank pursues an expansionary monetary policy, the economy moves from point A to point B in the short run. At point B, expected inflation is still low, but actual inflation is high. Unemployment is below its natural rate. In the long run, expected inflation rises, and the economy moves to point C. At point C, expected inflation and actual inflation are both high, and unemployment is back to its natural rate.



The higher the expected rate of inflation, the higher the short-run trade off between inflation and unemployment.

14.4 The Long-run Phillips Curve and Central Bank Independence

The government might use an expansionary fiscal policy to boost aggregate demand with the intention of reducing unemployment below its natural rate. If this is anticipated it will only increase inflation (move to point C). An alternative is to give the governor of the central bank control of monetary policy and tell her/him that she/he will be fired unless a specified low level of inflation is achieved over a reasonable time period. What does this achieve? Without the expansionary policy the economy remains at point A. The level of unemployment is no worse than what we ended up with following the government's previous attempt to reduce it by following an expansionary policy. And inflation is lower. So this is a better outcome (stay in point A).

We can also model this using game theory. A government would prefer point B to point A. Firms and workers know this and know that if they don't raise their inflation expectations then the government will pursue an expansionary policy. So firms and workers raise their inflation expectations and we move to point C. Point C can be thought of as a Nash equilibrium. But C is worse than A. Hence the best thing for the government to do to maximize its chances of re-election is to make the central bank independent and hand over control of monetary policy to it.

- The Bank of England was given independence and an inflation target in 1997.
- The ECB has been independent since its inception in 1998 and is responsible for deciding what level of inflation should be targeted and then achieving that target level.
- The US Federal Reserve is, like the ECB, independent in both design and implementation of monetary policy but does not pursue a formal inflation target.

14.5 Shifts In The Phillips Curve: The Role Of Supply Shocks

Historical events have shown that the short-run Phillips curve can shift due to changes in expectations.

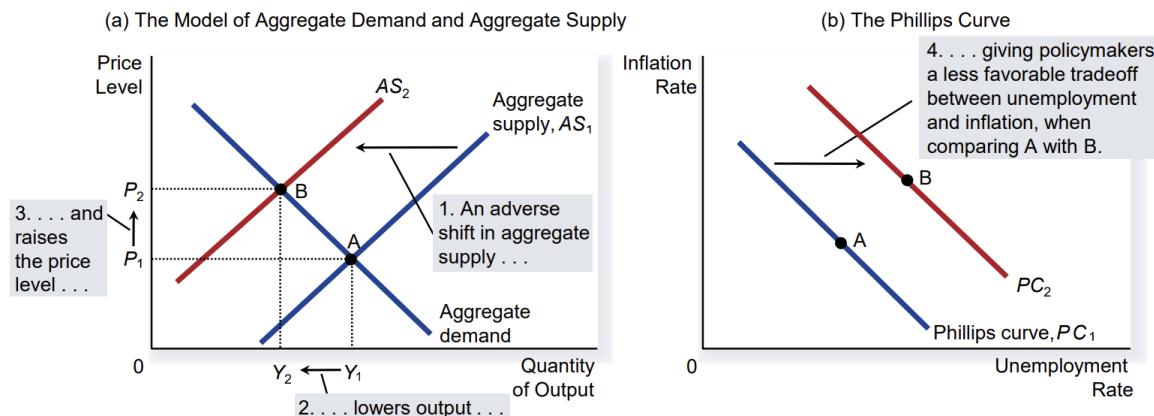
A supply shock is an event that directly affects firms' costs of production and thus the prices they charge – it shifts the economy's AS curve, and as a result the Phillips curve.

A **supply shock** is an event that directly alters the firms' costs, and, as a result, the prices they charge....
.... This shifts the economy's aggregate supply curve and as a result, the Phillips curve

The short-run Phillips curve also shifts because of shocks to aggregate supply. Adverse changes in aggregate supply can worsen the short-run trade-off between unemployment and inflation. An adverse supply shock gives policymakers a less favourable trade-off between inflation and unemployment.

$$\text{Unemployment rate} = NRU - \alpha \cdot (\text{Actual Inflation} - \text{Expected Inflation}) + \text{Supply Shock}$$

Panel (a) shows the model of AD and AS. When the AS curve shift to the left from AS_1 to AS_2 , the equilibrium moves from point A to point B. Output falls from Y_1 to Y_2 , and the price level rises from P_1 to P_2 . Panel (b) shows the short-run trade-off between inflation and unemployment. The adverse shift in AS moves the economy from a point with lower unemployment and lower inflation (point A) to a point with higher unemployment and higher inflation (point B). The short-run phillips curve shifts to the right from PC_1 to PC_2 . Policymakers now face a worse trade-off between inflation and unemployment.



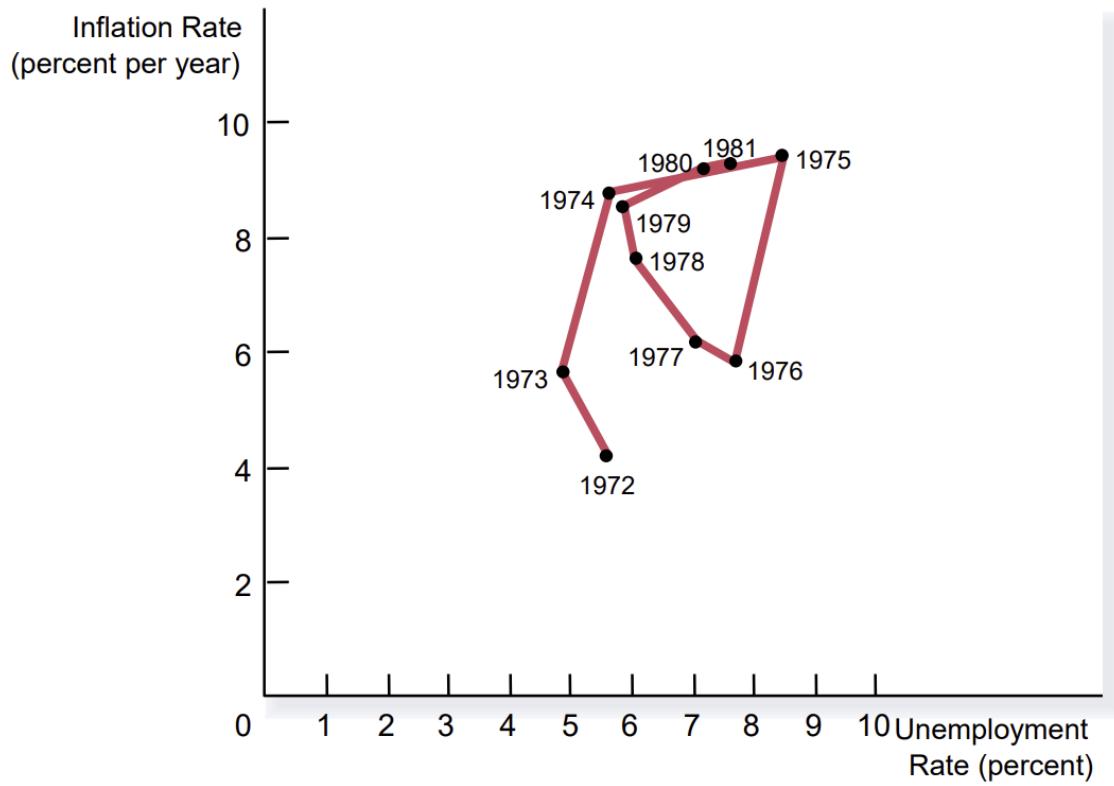
14.5.1 Two causes of rising and falling inflation

1. **Demand-pull inflation:** Inflation resulting from demand shocks. Positive shocks to aggregate demand cause unemployment to fall below its natural rate, which “pulls” the inflation rate up.
2. **Cost-push inflation:** Inflation resulting from supply shocks. Adverse supply shocks typically raise production costs and induce firms to raise prices, “pushing” inflation up.

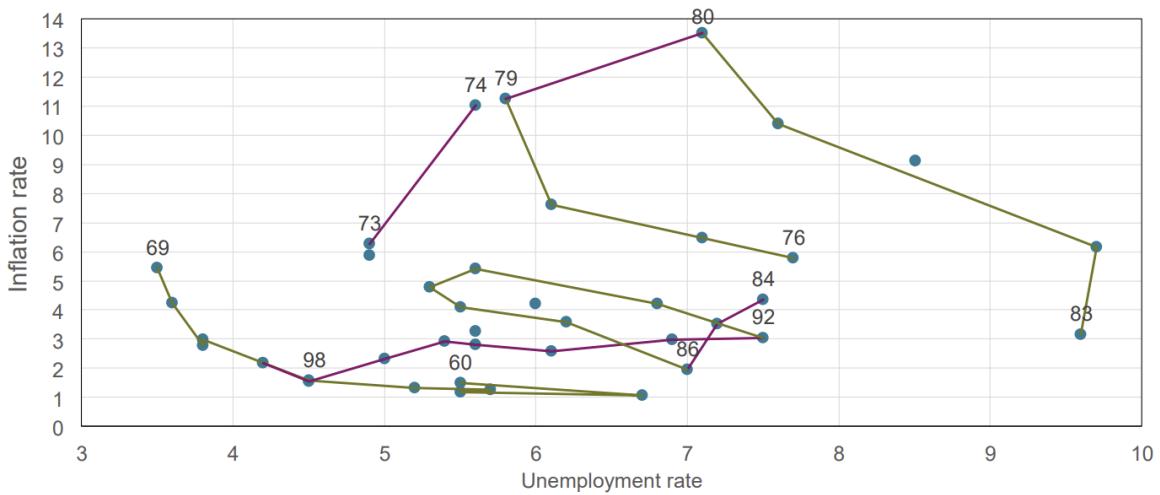
14.5.2 Example: Oil Price

In the 1970s, policymakers faced two choices when OPEC cut output and raised worldwide prices of petroleum:

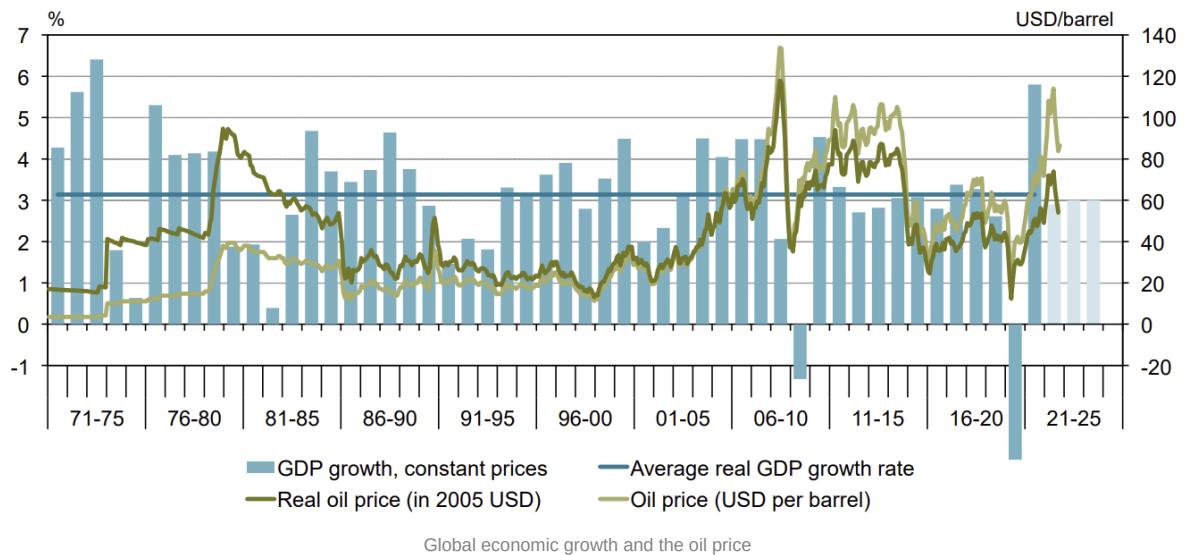
- Fight the unemployment battle by expanding aggregate demand and accelerate inflation
- Fight inflation by contracting aggregate demand and endure even higher unemployment



The Supply Shocks of the 1970s



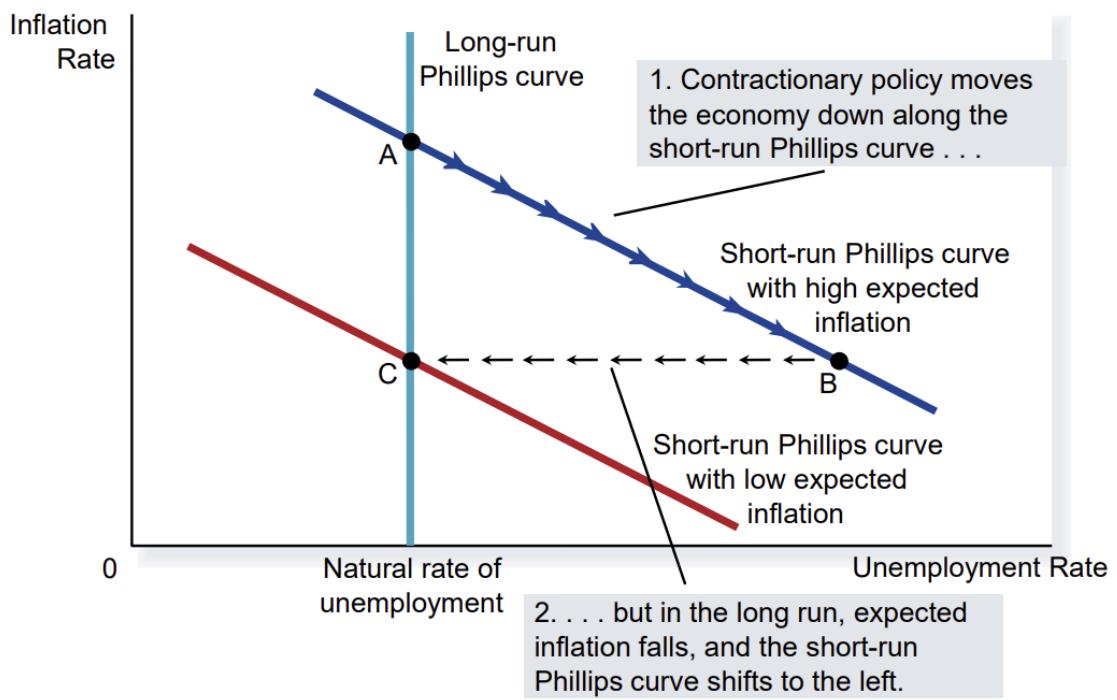
Phillips Curve in the United States (1960-1999)



14.6 The Cost of Reducing Inflation

Disinflation: the reduction in the rate of inflation

To reduce inflation, the Central Bank (CB) has to pursue contractionary monetary policy. When the CB slows the rate of money growth, it contracts aggregate demand. This reduces the quantity of goods and services that firms produce. This leads to a rise in unemployment.



When the central Bank pursues contractionary monetary policy to reduce inflation, the economy moves along a short-run Phillips curve from point A to point B, which has lower inflation and higher unemployment. Over time, as people come to understand that prices are rising more slowly, expected inflation falls, and the short-run Phillips curve shifts downwards. The economy moves from point B to point C. Inflation is lower and unemployment is back at its natural rate.

Thus, if a nation wants to reduce inflation, it must endure a period of high unemployment and low output.

When the Central Bank combats inflation, the economy moves down the short-run Phillips curve. The economy experiences lower inflation, but at the cost of higher unemployment.

This cost is represented by the movement of the economy through point B as it travels from point A to point C. The size of this cost depends on the slope of the Phillips curve and how quickly expectations of inflation adjust to the new monetary policy.

The **sacrifice ratio** is the number of percentage points of annual output that is lost in the process of reducing inflation by one percentage point

$$\text{Sacrifice ratio} = \frac{\text{CHF cost of loss of production}}{\text{Percentage change in inflation}}$$

An estimate of the sacrifice ratio is five. To reduce inflation from about 10% to 4% in the US in 1979 would have required an estimated sacrifice of 30% of annual output!

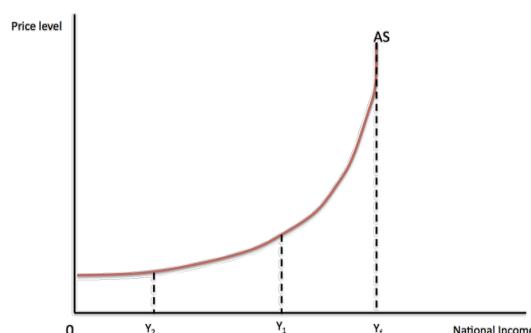
14.6.1 Rational Expectations and the Possibility of Costless Disinflation

Adaptive expectations: People base their inflation expectations on recently observed inflation.

Rational expectations: People base their inflation expectations on all available information, including information about current and prospective future policies. The theory of rational expectations suggests that people optimally use all the information they have, including information about government policies, when forecasting the future.

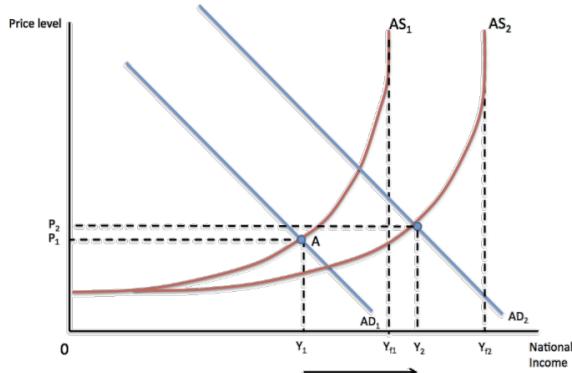
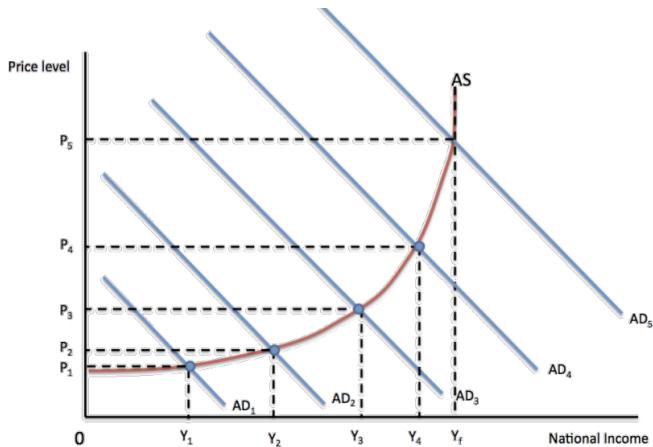
Expected inflation explains why there is a trade-off between inflation and unemployment in the short run but not in the long run. How quickly the short-run trade-off disappears depends on how quickly expectations adjust. The theory of rational expectations suggests that the sacrifice-ratio could be much smaller than estimated.

14.7 The Shape of the New Keynesian Short-Run Aggregate Supply Curve



The trade-off between an increase in national income and price rises depends on how large the output gap is. If AD continues to shift to the right eventually means that national income will only rise by relatively small amounts but the pressure on resources will cause the price level to rise more quickly. Getting the output gap wrong when using fiscal tools can lead to unanticipated consequences.

Rising prices with little growth. Large fall in national income with little impact on inflation levels.



Shifting the aggregate supply to the right can lead to sustained growth, Increases living standards and Keeps prices stable. Supply side economists improve the workings of free markets using:

1. **Market-oriented supply-side** policies designed to free up markets to improve resource allocation through more effective price signals.
2. **Interventionist supply-side** policies focused on improving the working of markets through investing in infrastructure, education and research and development.

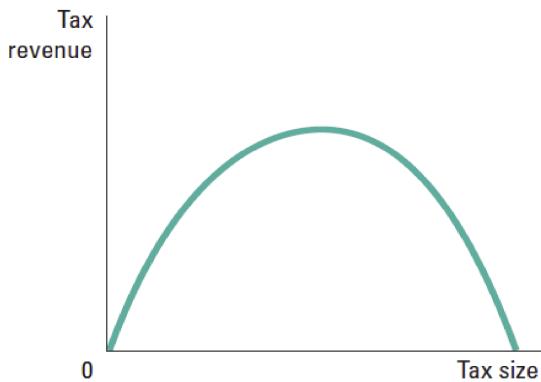
14.7.1 Market Orientated Supply-Side Policies

There are four elements to market-oriented supply-side policies:

1. **Reform tax and welfare policy:** Taxes are a disincentive to work and distort market outcomes. Higher tax rates reduce the opportunity cost of leisure. Higher taxes encourage tax avoidance and evasion. Welfare payments act like a negative tax and therefore also distort market outcomes.
Cutting tax rates can (but do not have to) mean that tax revenues actually increase. Individual might work harder as his/her net return increases. It affects those looking for work. Raising the threshold for paying tax, increases the gap between welfare earnings and potential earnings. Those on benefits are less fussy about choosing jobs. Fewer would choose to be voluntarily unemployed.

The Laffer Curve and Supply-Side Economics

The Laffer curve looks at the relationship between tax rates and tax revenue. Laffer argued that US taxes were too high and reducing them would increase tax revenue. Cutting taxes to raise revenue may be correct if applied to taxpayers facing the highest tax rates, but most people face lower marginal rates. The more elastic that supply and demand are in any market, the more taxes in that market distort behaviour, and the more likely it is that a tax cut will raise tax revenue.



2. **Flexible Labour Markets:** Three aspects to getting more flexible labour markets:
 - I. Reduce trade union power and encourage local level wage agreements
 - II. Reduce rigidities in the labour market by increasing the ease of hiring and firing. Includes more short-term contracts. However, power balance may be too much with employers.
 - III. Improving market information for employers, workers and the unemployed
3. **Reducing Government Spending:** The more money government spends the more it has to raise in tax revenue and/or borrow. Leads to crowding out effect. Government spending not as efficient as private sector investment
If borrowing can be scaled back, interest rates will fall and this has an effect on firms' decisions to invest.
4. **Privatization and Deregulation:** Privatization is the transfer of public ownership of assets to the private sector. It is common in many European countries. It should lead to higher productivity and lower costs. However the privatization of monopolies with ineffective regulation can reduce consumer surplus.
Deregulation should remove some market imperfections. Deregulation went too far and appropriate checks and balances were not in place to prevent the financial crisis in 2007–2008.

14.7.2 Interventionist Supply-Side Policies

Four key aspects to interventionist supply-Side policies:

1. Infrastructure Investment: Governments involved where there are long term benefits
2. Investment in Education and Training
3. Research and Development: Research bodies , tax relief or grants
4. Regional or Industrial Policies: Designed to encourage investment and the regional multiplier

▼ Summary of the Chapter

- The Phillips curve describes a negative relationship between inflation and unemployment
- By expanding aggregate demand, policymakers can choose a point on the Phillips curve with higher inflation and lower unemployment
- By contracting aggregate demand, policymakers can choose a point on the Phillips curve with lower inflation and higher unemployment
- The trade-off between inflation and unemployment described by the Phillips curve holds only in the short run
- The long-run Phillips curve is vertical at the natural rate of unemployment
- The short-run Phillips curve also shifts because of shocks to aggregate supply
- An adverse supply shock gives policymakers a less favorable trade-off between inflation and unemployment
- When the CB contracts growth in the money supply to reduce inflation, it moves the economy along the short-run Phillips curve
- This results in temporarily high unemployment
- The cost of disinflation depends on how quickly expectations of inflation fall
- Supply-side policies became a focus of many governments in the 1980s and into the 1990s

- Bottlenecks can occur if trying to shift aggregate demand as factors of production become more scarce
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15. The Euro Area and the Crises

15.1 Financial Crisis

15.1.1 What has happened and why did it happen?

Preconditions:

- Financial globalisation / financial market deregulation: 1980s and 1990s
- Easy monetary policy: Low interest rates and high liquidity in the system
- Financial innovation: securitization

Implications:

- Global current account imbalances and global savings glut
- Lack of transparency: multiple securitization layers
- Lax of supervision and regulation in the financial system
- Distorted incentives of rating agencies
- Contingent public guarantees and other policy distortions
 - subsidizing home ownership

Result:

- overleveraging and excessive risk taking
- strong interconnection among balance sheets

15.1.2 The Bubble bursts

In 2006-07 the prevailing concern among central banks was inflation. The Federal Reserve raised interest rates for 16 consecutive months starting in 2005. By the autumn of 2006 the Federal funds rate was 5.25%.

Some homeowners found their interest payments more than doubling. Many could not afford the higher payments and were forced to sell their homes or had their homes repossessed by their mortgage lender. House prices began to fall as a result. As prices fell, more and more people found they owed more to their mortgage lender than their home was worth – they had negative equity in their home.

15.1.3 The problem at the banking level

Bursting of the housing bubble forces banks to write down loans. Banks' financial distress forces them to sell loans and assets and reduce bank lending (Credit crunch). More unfortunately: When lenders and other counterparties begin to question the solvency of a financial institution, they stop lending and transacting with the bank. This is particularly problematic if a bank relies on short-term debt. So you can have a "bank run" even if the institution is solvent (or would be solvent) under normal conditions. At the peak of the crisis:

- Everyone is suspicious of everyone else
- No short-term credit available
- Banks will not lend to each other short-term

- Rumours of trouble lead to runs on short-term debt (deposits)
- Downward spiral - Bank runs

15.1.4 Moral Hazard

The authorities were faced with the challenge of helping to save banks from collapse. However, this leads to a problem of moral hazard: If banks knew that they would be bailed out, then they would have less incentive to pursue prudent lending practices. The issue of moral hazard might be the reason why one of the most spectacular banking collapses in recent times occurred on 15 September 2008.

Lehman Brothers had been at the forefront of the sub-prime and CDS market. It had borrowed heavily to finance its activities. The Lehman collapse was notable because it showed that central banks were not prepared to step in and help any bank that got into trouble.

The insurer AIG had been an active seller of CDS and the Lehman collapse left it seriously exposed. The US government supported (bailed out) AIG because so much of the rest of the economy and financial system would have been affected if AIG had gone bankrupt.

15.1.5 The reactions of central banks and fiscal authorities to the financial crisis

Intervention began when credit markets froze. The ECB authorized an injection of €95 billion into the financial markets on 9 August 2007 and another €61 billion the next day. The Fed announced a \$38 billion injection soon after. As 2008 progressed the signs became clearer that the financial crisis was spilling over into the real economy. In October, seven major countries announced a coordinated 0.5% cut in interest rates. In the US, discussions to set up the \$700 billion Troubled Asset Relief Plan (TARP) to support banking system were followed the announcement of a further \$800 billion support by the Fed in November. Governments took additional steps e.g. extra guarantees to protect bank deposits, injecting money into banks, nationalizing banks.

15.1.6 Lessons learned?

Was weak regulation to blame for the crisis? Can stronger regulation prevent a future financial crisis of the scale of the 2007-09 crisis? The OECD has been critical of national regulatory bodies and identified the following key causes of the crisis:

- The bonus culture in banks
- Credit ratings agencies
- Failures in corporate governance
- Poor risk management strategies and understanding

15.2 Euro Area Crisis

15.2.1 The Development of the Crisis

Low interest rates before the crisis made borrowing easier. The resultant boom in housing and construction helped to drive economic growth in Greece, Italy, Spain, Portugal and Ireland. When the financial crisis hit, credit dried up. The housing market collapsed and construction was badly hit. Banks were badly exposed and needed government support. Government debts rose and were seen as a higher risk. The interest rates on these sovereign debts rose. These countries started to ask for bailouts. Those countries with better fiscal discipline demanded more austerity from the peripheral countries. Part of deals involved a haircut with private sector creditors losing a percentage of their investments.

15.2.2 The Greek Debt Crisis

When the Greek Government's debt increased well beyond the terms of membership of the European Monetary Union, other members of the EU accused Greece of living beyond its means (free rider problem). Greece had to raise around €50 billion in 2010 to meet its debt obligations and cut spending. It soon needed more € because it could not make the desired fiscal cuts. Interest rates on two-year bonds rose to 19%. One option was for Greece to default. This possibility led to a fall in the value of the Euro, since other countries in trouble might be forced to follow (contagion). Countries offered to provide emergency loans, but on the insistence that Greece makes larger cuts in public spending (having exploited the free-rider problem associated with a common currency). Greek citizens protests meant the markets got the jitters.

15.2.3 Austerity measures: Too far – too quickly?

A feature of the sovereign debt crisis has been the adoption by a number of countries of austerity programmes. This comprises of significant cuts in public spending, tax rises and structural reforms. Such policies are adopted during a period of weak economic activity are likely reduce national income and raise unemployment. In a prolonged recession the prospects for any growth-led recovery looks bleak.

15.2.4 Fiscal Consolidation: Arguments in favour

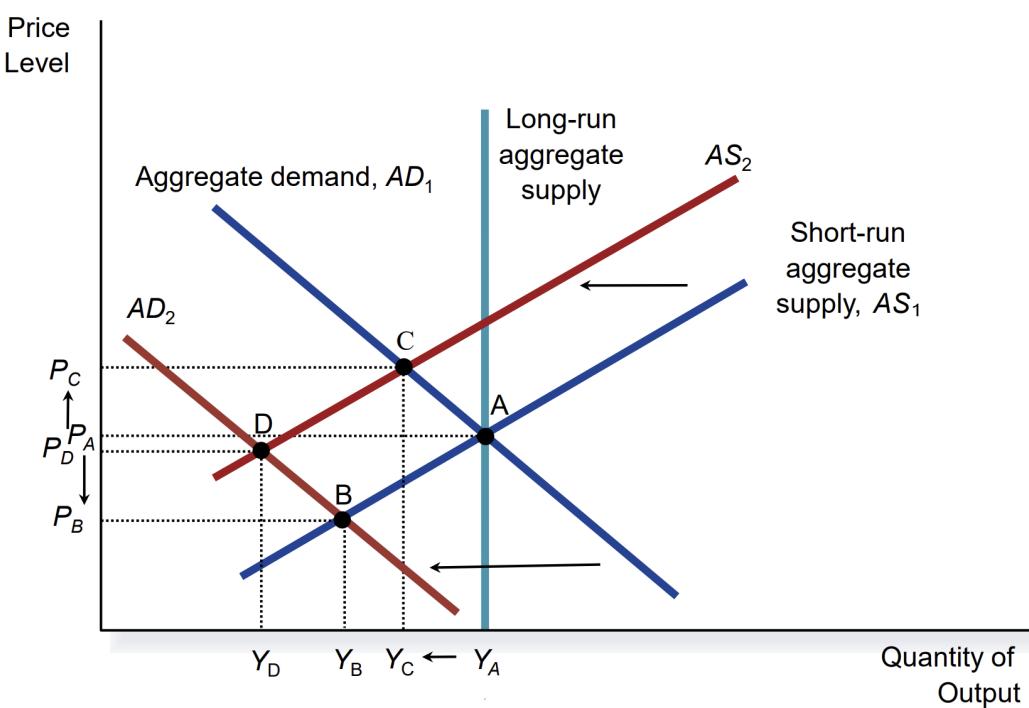
Policymakers need to eradicate structural deficits through fiscal consolidation because they increase: The costs of servicing the debt, the likelihood of default by governments, uncertainty in the financial markets and currency instability.

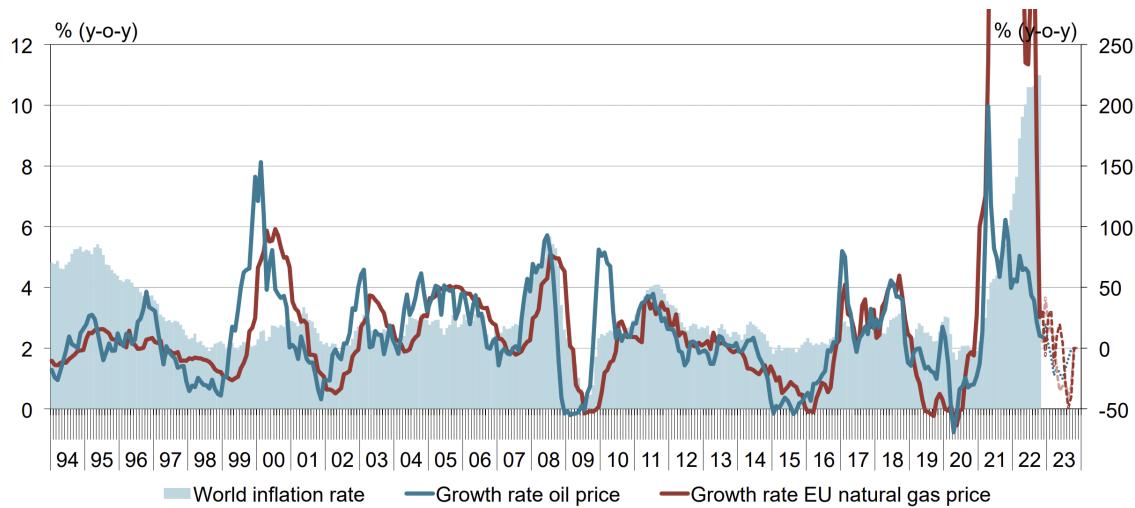
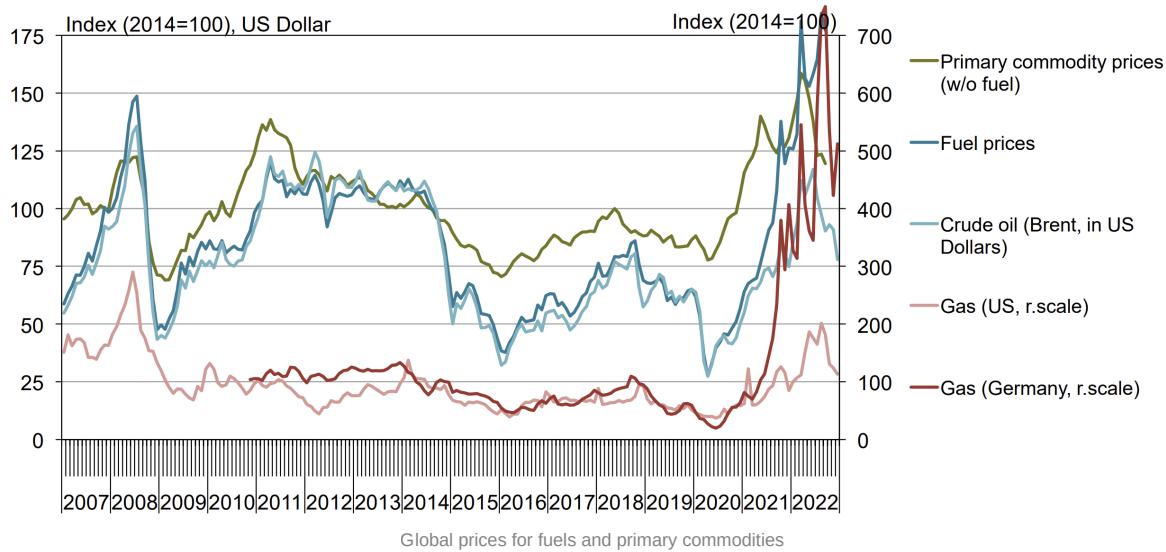
The government should balance its budget. Rising government debt falls on future generations of taxpayers. Inheriting such a large debt may lower the living standard of future generations. Budget deficits represent negative public saving they lower national saving, raise interest rates and therefore a lower capital stock. This reduces future productivity and therefore incomes. Public deficits are justified during war. It is also justified during a temporary downturn in economic activity.

15.2.5 Fiscal Consolidation: Arguments against

The Idea of a Structural Deficit is a Myth. The assumption is that the structural deficit is the amount a government borrows when the economy is operating at its trend level. Therefore we need to know how far the economy is operating below trend – the output gap. Economists disagree on the size of the output gap. There are just too many assumptions and variables which have an impact on the output gap that it renders it useless. The Government Should Not Balance its Budget. Economies, unlike people live forever, so there is never any reason to clear the debt completely. Population growth and technological progress cause the total income of the economy to grow over time. As long as the debt grows more slowly than the nation's income, there is nothing to prevent government debt from growing forever. The government's budget deficit or surplus should be considered together with these other policies e.g. spending that raises future productivity.

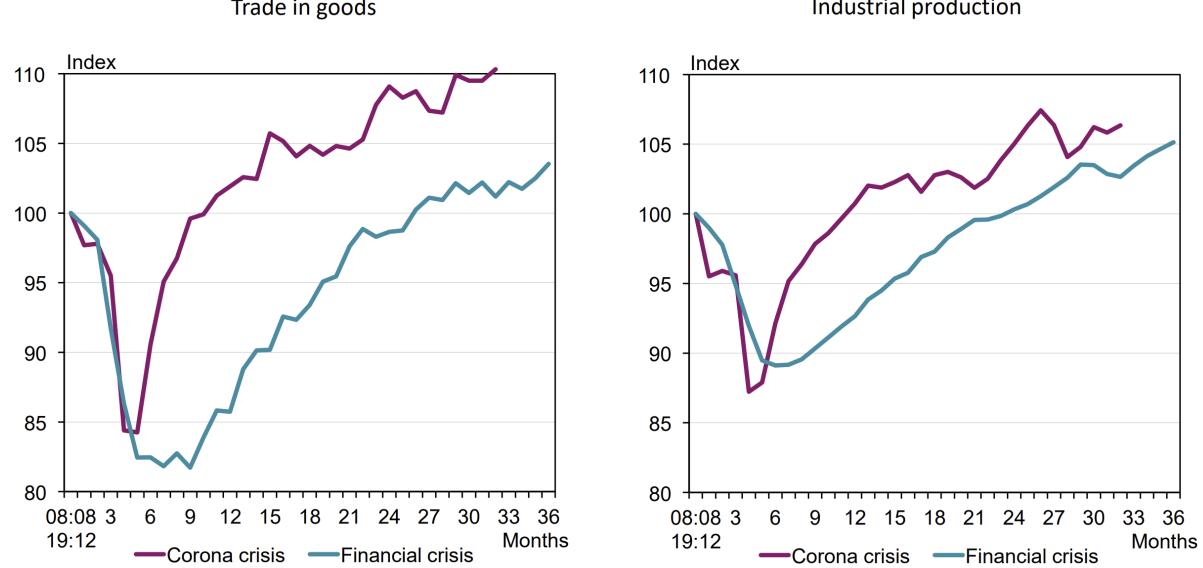
16. The Corona Crisis (from an economic angle)



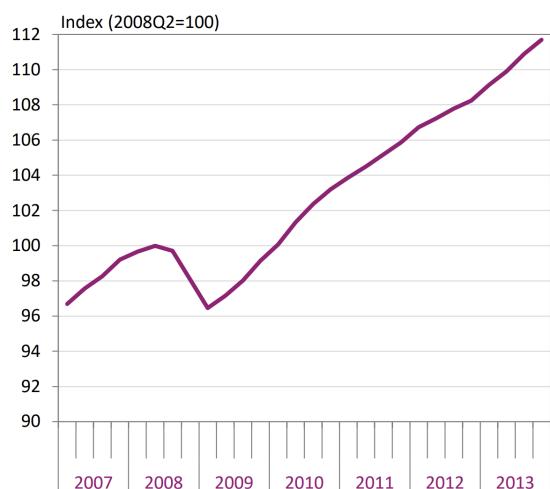


Source: World Bank

Inflation in the world and the oil and gas price

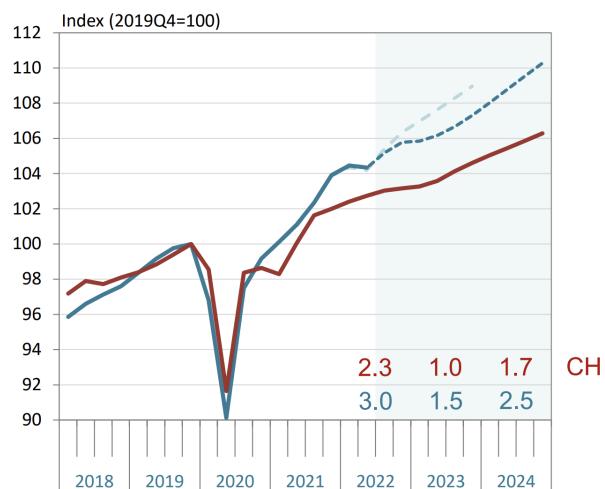


Financial crisis



Source: IMF

Corona and energy crisis



Sources: IMF, KOF (22.06.2022 / 05.10.2022)

World GDP - Financial vs. Corona and Energy Crisis