MACROECONOMICS PREPARATORY COURSE

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Tor Vergata - EEBL - 2023/2024

OVERVIEW

- Day 1:
  - Economics and economic reasononing;
  - Economic Growth, Business Cycles, and Unemployment;
  - Measuring and Describing the Aggregate Economy.
- Day 2:
  - The Keynesian Short-Run Policy Model: Demand-Side Policies;
  - The Classical Long-Run Policy Model: Growth and Supply-Side Policies;
  - Inflation, Deflation, and Macro Policy.
- Day 3:

- The Supply of Money

CHAPTER 1

Economics and Economic Reasoning

Chapter Goals

- Define economics and identify its components.
- Discuss various ways in which economists use economic reasoning.
- Explain real-world events in terms of economic forces, social forces, and political forces.
- Explain how economic insights are developed and used.
- Distinguish among positive economics, normative economics, and the art of economics.

What Economics Is

Economics is the study of how human beings coordinate their wants and desires, given the decision-making mechanisms (?), social customs, and political realities of the society.

The three central coordination problems any economy must solve are:

1. What, and how much, to produce
2. How to produce it
3. For whom to produce it

Scarcity

Coordination is required to efficiently allocate scarce resources to achieve social goals. (Q: which ones?)

Scarcity exists because individuals want more than can be produced.

Scarcity means the goods available are too few to satisfy individuals' desires.

The degree of scarcity is constantly changing.

The quantity of goods, services and usable resources depends on technology and human action.

Microeconomics and Macroeconomics

Economic theory is divided into two parts:

1. **Microeconomics** is the study of individual choice, and how that choice is influenced by economic forces.
2. **Macroeconomics** is the study of the economy as a whole.

Microeconomics and Macroeconomics

Microeconomics studies things such as:

- The pricing of firms
- Household decisions on what to buy
- How markets allocate resources among alternative ends

Macroeconomics studies such things as:

- Income
- Inflation
- Unemployment
- Economic growth

A Guide to Economic Reasoning

Economic reasoning or “thinking like an economist” involves things such as:

- Analyzing issues and comparing costs and benefits of a decision
- Abstracting from the unimportant elements of a question and focusing on the important ones
- *Questions:* Are we talking about monetary costs and benefits? To what extent are costs and benefits also part of social norms?

A Guide to Economic Reasoning

Steve Levitt's bestseller *Freakonomics* contains many examples of "thinking like an economist."

For example, Levitt uses economic reasoning to explain why people become drug dealers.

The potential financial ***benefit*** of selling drugs is much higher than the ***cost*** of giving up a minimum wage job.

Marginal Costs and Marginal Benefits

Using economic reasoning, decisions are often made by comparing marginal costs and marginal benefits.

Marginal cost is the additional cost over and above costs already incurred.

Marginal benefit is the additional benefit above what has already derived.

Economic reasoning is based on the premise that everything has a cost.

The Economic Decision Rule

If the marginal benefits of doing something exceed the marginal costs, do it.

MB > MC → Do it!

If the marginal costs of doing something exceed the marginal benefits, don't do it.

MC > MB → Don't do it!

Opportunity Cost

Opportunity cost is the benefit that you might have gained from choosing the next-best alternative.

Opportunity cost should always be less than the benefit of what you have chosen.

Opportunity cost is the basis of cost/benefit economic reasoning.

Examples of Opportunity Cost

Individual Decisions

The opportunity cost of college includes:

- Items you could have purchased with the money spent for tuition and books.
- Loss of the income from a full-time job.

Government Decisions

- The opportunity cost of money spent on the war on terrorism is less spending on health care or education.

Opportunity Cost: Types of Costs

Opportunity cost focuses on two aspects of the costs of a choice that may be forgotten:

- **Implicit costs** are costs associated with a decision that often are not included in normal accounting costs.
- **Illusionary sunk costs** are costs that show up in financial accounts that are already spent.
- Implicit costs should be included in opportunity costs but illusionary sunk costs should not be included.
- Costs relevant to decisions are often different from the measured costs.

Economic Knowledge in One Sentence

This one sentence embodies the concept of opportunity cost:

There ain’t no such thing as a free lunch.

Abbreviated as TANSTAAFL.

Economic and Market Forces

Economic forces: the necessary reactions to scarcity.

A **market force** is an economic force that is given relatively free rein by society to work through the market.

The invisible hand is the price mechanism that guides our actions in a market. The invisible hand is an example of a market force.

- If there is a *shortage*, prices rise.
- If there is a *surplus*, prices fall.

The Invisible Hand Theorem

According to the invisible hand theorem, a market economy, through the price mechanism, will allocate resources efficiently.

- Price has a tendency to *fall* when quantity supplied is greater than quantity demanded.
- Price has a tendency to *rise* when the quantity demanded is greater than the quantity supplied.

Efficiency: achieving a goal as cheaply as possible.

Social and Political Forces

What happens in society can be seen as a reaction to, and interaction of:

- Economic forces
- Social forces
- Political forces

Social and political forces influence market forces.

Social and political forces often work together against the invisible hand.

Objective and Subjective Economic Policy

Economic policies are actions (or inaction) taken by the government to influence economic actions.

There are two types of policy analysis:

1. **Objective** policy analysis keeps value judgments separate from the analysis.
2. **Subjective** policy analysis reflects the analyst's views of how things should be.

Economic Policy Options

To distinguish between objective and subjective analysis, economics is divided into three categories:

1. **Positive economics** is the study of what is and how the economy works.
2. **Normative economics** is the study of what the goals of the economy should be.
3. **The art of economics** is using the knowledge of positive economics to achieve the goals determined in normative economics.

Examples of Categories of Economics

Examples of each of the three categories of economics:

1. **Positive economics** asks questions such as: How does the market for microchips work? It is based on facts.
2. **Normative economics** asks questions such as: What should tax policy be designated to achieve? It is based on value judgments.
3. **Art of economics** looks at questions such as: To achieve the goals that society wants to achieve, how would you go about it, given the way that the economy works?

Chapter Summary (23 of

Three coordination problems are what to produce, how to produce it, and for whom to produce it.

Economics is divided into microeconomics and macroeconomics. Microeconomics is the study of individual choice and how that choice is influenced by economic forces. Macroeconomics is the study of the economy as a whole.

Economic reasoning structures all questions in a cost/benefit framework.

“There ain’t no such thing as a free lunch” embodies the concept of opportunity cost.

Chapter Summary (24 of

Unlike market forces, economic forces and the forces of scarcity are always at work.

Economic reality is controlled by economic, political, and social forces.

Under certain conditions, the market, through its price mechanism, will allocate scarce resources efficiently.

Economics can be subdivided into positive economics, normative economics, and the art of economics.

CHAPTER 2

Economic Growth, Business Cycles, and Unemployment

Chapter Goals

- Discuss the history of macroeconomics, distinguishing Classical and Keynesian macroeconomists.
- Define *growth* and discuss its recent history.
- Distinguish a business cycle from structural stagnation.
- Relate unemployment to business cycles and state how the unemployment rate is measured.

Macroeconomic Outlook

Macroeconomic outlook report: Italy | Management Solutions (Q420)

• During the fourth quarter of 2020, the Italian economy recorded a GDP annual growth rate of -6.58%, decelerating 1.42 p.p. compared with the previous quarter, after the reintroduction of containment measures motivated by the resurgence of the pandemic which particularly affected the service sector.

• Concerning the labor market, the unemployment rate decreased by 0.63 p.p. compared to the previous quarter, down to a rate of 9.20%. The y/y employment variation rate stood at -1.87%, despite recording an increase of 0.51 p.p. compared to the third quarter of 2020.

• The euro appreciated against the U.S. dollar compared to the previous quarter, with an average exchange rate of 1.19 $/€ which was 0.02 dollars per euro higher than in 3Q20.

• The Italian Consumer Price Index increased by 0.26 p.p. compared to the previous quarter, up to a rate of -0.23%.

What Is Macroeconomics?

Macroeconomics is the study of problems that affect the economy as a whole (lack of economic growth, recessions, unemployment, and inflation) and what to do about them.

Determination and fluctuation of 5 groups of phenomena:

- output/income and unemployment;
- interest rates, real and financial asset prices, nominal and real wages, and their interaction with investments, consumption, income distribution, and growth;
- price level, and its interaction with output, employment, wage, interest rate;
- real and nominal exchange rate, and its relation with aggregate demand, price level, BOP, demand for and supply of financial assets in international capital markets;
- Money, credit, public expenditure, taxation, public deficit and public debt.

The Historical Development of Macro

Throughout the world, there are spirited debates about the appropriate macroeconomic policy.

To understand the nature of current policy debate, it's helpful to review the historical development of macroeconomics.

The Historical Development of Macro (30 of

- Pre-Keynesian:
  - Physiocrat, 18th-century (land and laissez-fair);
  - classical/mercantilist and Marxian (labor and growth);
  - marginalist or Walrasian, 1870-1890: equilibrium, no growth and distribution.

- Keynesian, 1930s: expectations, uncertainty, and money.

- Neo classical synthesis, 1940s: IS-LM/AS-AD.

The Historical Development of Macro (31 of

- New classical macro, Lucas, 70s: rational expectations, work vs leisure.

- Real Business Cycle: methodologic individualism.

- New Keynesian macro, 80s: market imperfections and asymmetric information.

- Neo-Keynesian Dynamic Stochastic General Equilibrium Model: RBC + NEK: IS with expectation + forward looking Phillips curve + monetary policy rule.

The Historical Development of Macro: Classical versus Keynesian

In 1930's focus of macroeconomics moved to include short run as well as long run issues.

There were two types of economics:

1. Earlier economists who focused on long-run issues were called ***Classical economists***.
2. Economists who focused on the short run were called ***Keynesian economists.***

The Historical Development of Macro

Classical economists believe that business cycles are temporary glitches, and generally favor laissez-faire, or nonactivist policies.

Keynesian economists believe that business cycles reflect underlying problems that can be addressed with activist government policies.

By the 1980s, Classical and Keynesian economics merged into a new conventional macroeconomics.

Following the crash of 2008, the U.S. economy experienced **structural stagnation** – a period of protracted slow growth.

Two Frameworks: The Long Run and the Short Run

The long-run growth framework focuses on incentives for supply.

- Sometimes called supply-side economics.
- Issues of growth are considered in a long-run framework.

The short-run business cycle focuses on demand.

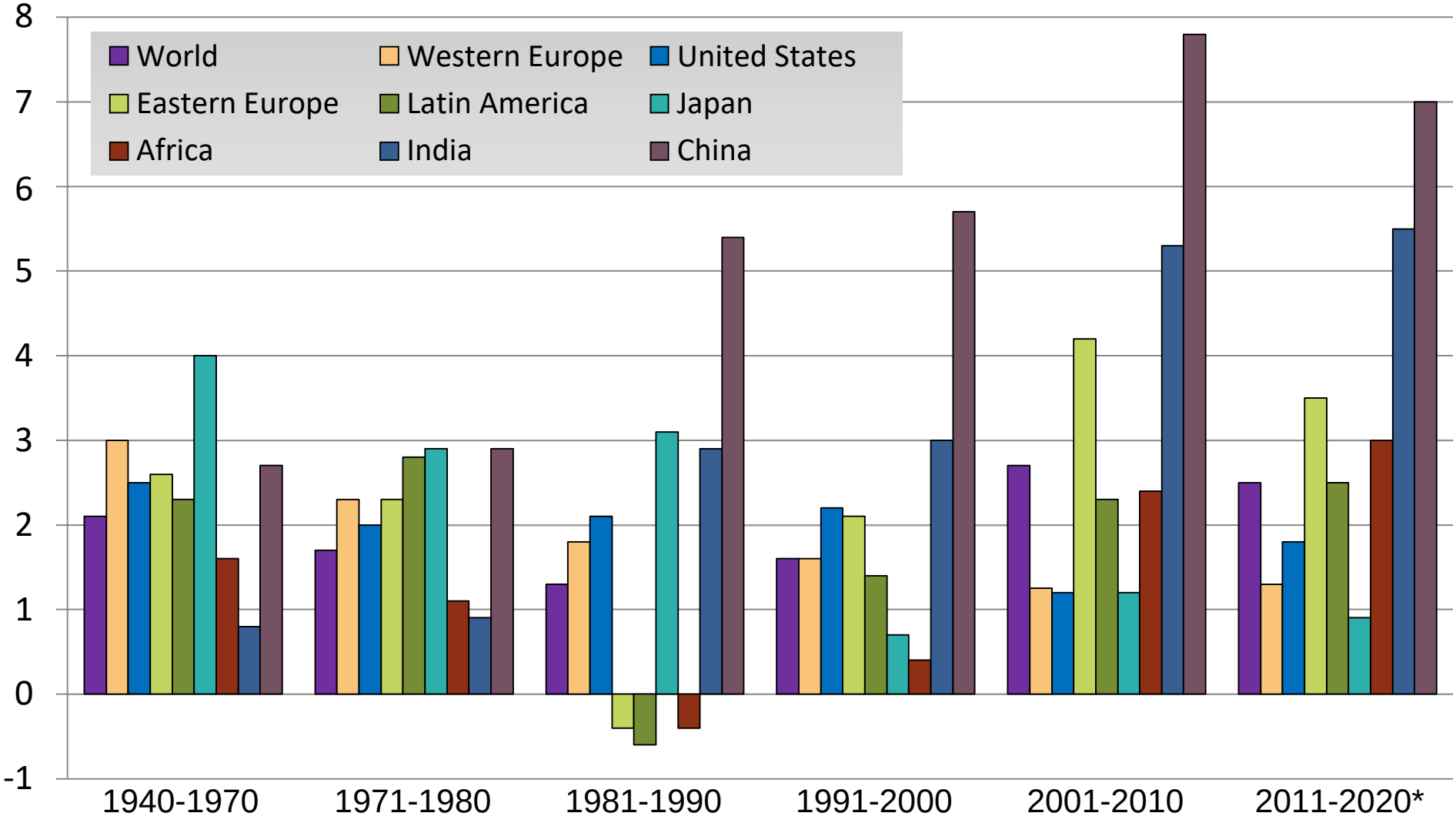
- Sometimes called demand-side economics.
- Business cycles are generally considered in a short-run framework.

Inflation and unemployment fall within both frameworks.

Two Frameworks: The Long Run and the Short Run

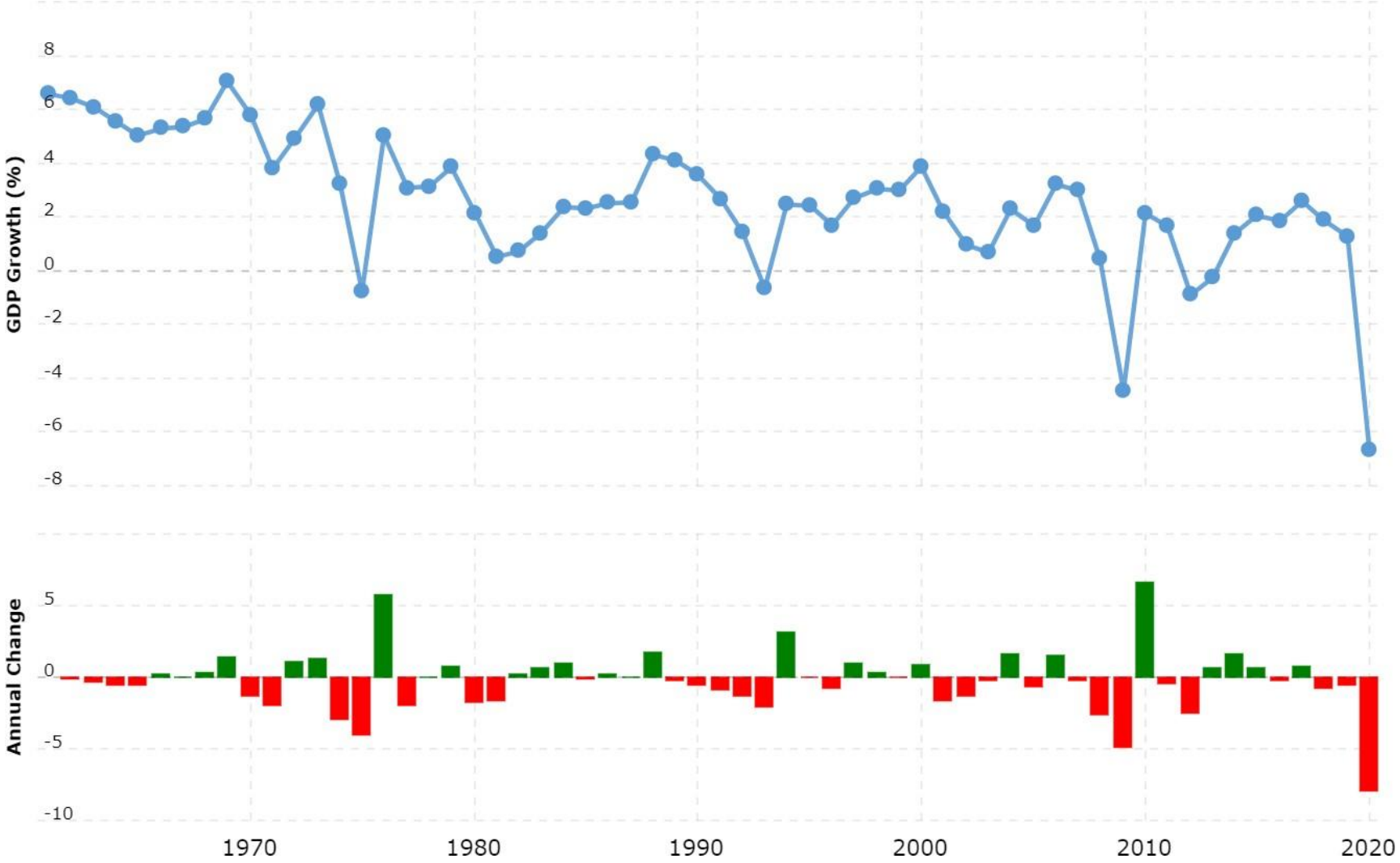
- The stark division between the short-run and the long-run frameworks is problematic.
- The economy is simultaneously in the long run and short run.
- Both frameworks have to be blended into a composite framework in which both supply and demand influence long-run and short-run forces.
- The long run is just a combination of short runs that cannot be separated.

Growth Rates around the World



*Estimates based on World Bank and government data and projections.

Growth Rates in the Euro Area



Growth

Economists measure growth with changes in total output over a long period of time.

Potential output is the highest amount of output an economy can sustainably produce and sell using existing production processes and resources.

U.S. economic output has grown at an annual 2.5 to 3.5 percent rate, *the secular growth trend*, which represents the rise in potential output.

Growth

Per capita output is output divided by the total population.

Even if total output is increasing, the population may be growing even faster, so per capita output would be falling.

When the population is growing, per capita growth is lower than overall growth.

Example: If the population is growing at 1% and the economy is growing at 3%, per capita growth is 2%.

Business Cycles and Structural Stagnation

A **business cycle** is the upward or downward movement of economic activity that occurs around the growth trend.

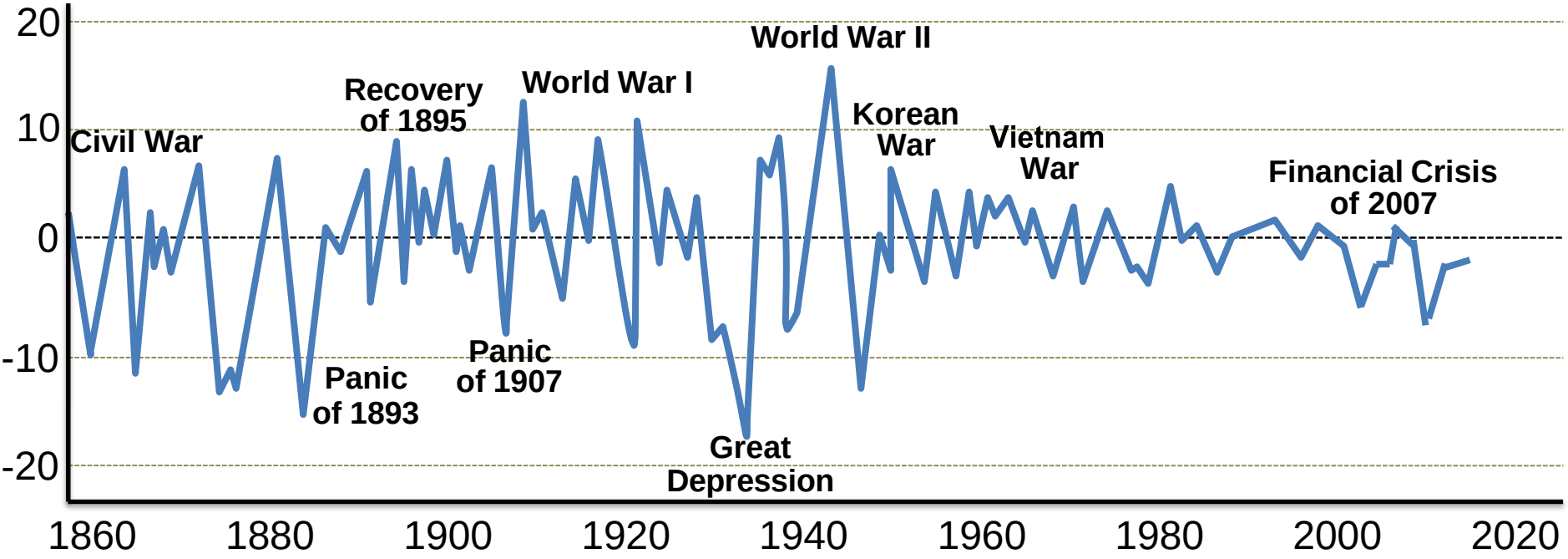
Classical economists argue that the government should just accept that business cycles occur and take a laissez-faire stance.

Keynesians economists argue that government can temper these fluctuations with policy actions.

U.S. Business Cycles

Percentage fluctuations in real GDP around trends

Business cycles have always been a part of the U.S. economic scene.

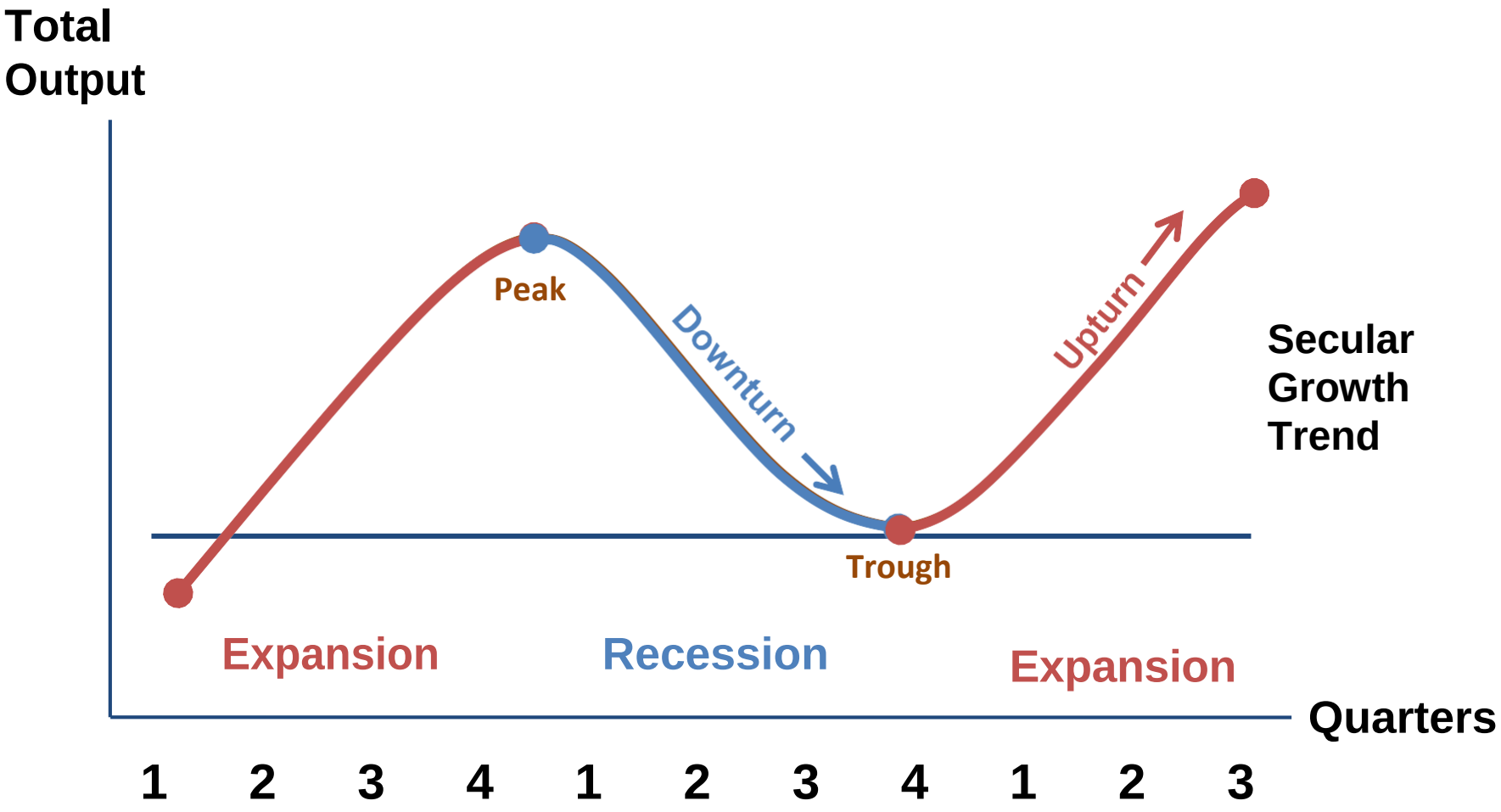


Describing the Business Cycle

Four phases of the business cycle: peak, downturn, trough, and upturn.

1. The top of a business cycle is called the **peak**.
2. Eventually the economy enters a **downturn** and may enter a *recession*.
    - A **recession** is a decline in real output that persists for more than two consecutive quarters of a year.
3. The bottom of a recession or depression is called the **trough**
4. As total output begins to expand, the economy comes out of the trough; economists say it's in an **upturn**.

Business Cycle Phases



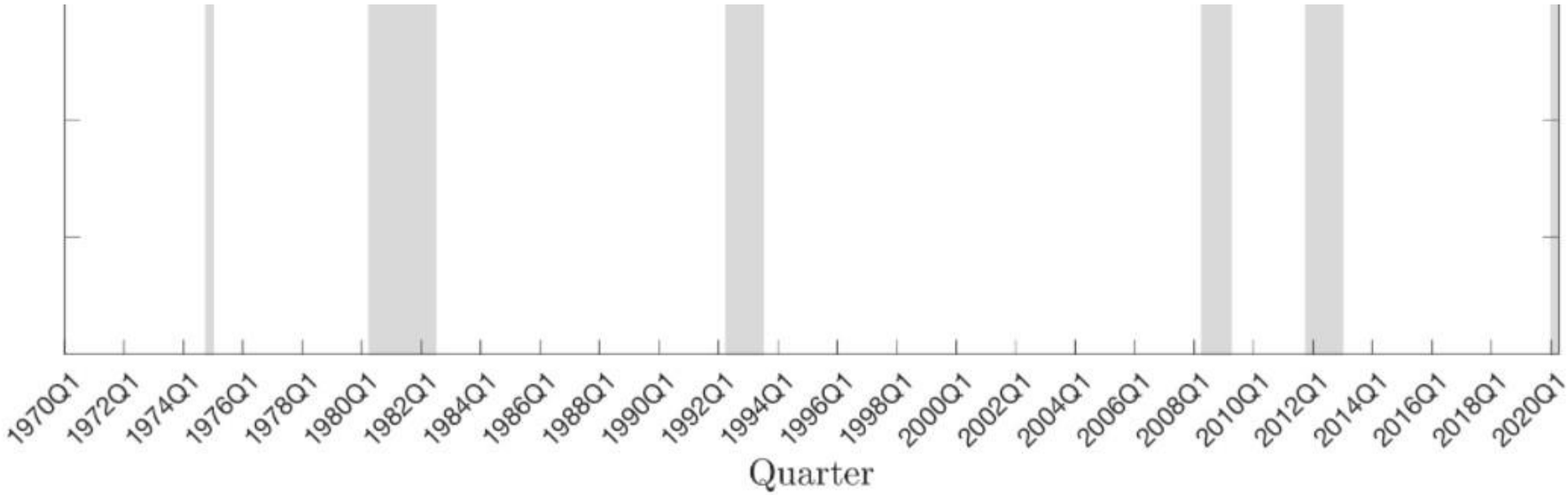
Euro Area Business Cycles

The «Euro Area Business Cycle Network» has identified the peak and trough quarters since 1970.

Date	Peak / Trough	Announcement Date
2019 Q4	Peak	29 September 2020
2013 Q1	Trough	1 October 2015
2011 Q3	Peak	15 November 2012
2009 Q2	Trough	4 October 2010
2008 Q1	Peak	31 March 2009
1993 Q3	Trough	22 September 2003
1992 Q1	Peak	22 September 2003
1982 Q3	Trough	22 September 2003
1980 Q1	Peak	22 September 2003
1975 Q1	Trough	22 September 2003
1974 Q3	Peak	22 September 2003

Chronology of Euro Area Business Cycles | EABCN

Euro Area Business Cycles



Duration and Timing of U.S. Business Cycles Since 1854

Business Cycles	Duration (in months)	
	Pre-World War II (1854 – 1945)	Post-World War II (1945 – 2018)
Number	22	11
Average duration	50	66
Length of longest cycle	99 (1870-79)	128 (1991-2001)
Length of shortest cycle	28 (1919-21)	28 (1980-82)
Ave. length of expansions	29	59
Length of shortest expansion	10 (1919-20)	12 (1980-81)
Length of longest expansion	80 (1938-45)	120 (1991-2001)
Ave. length of recessions	21	11
Length of shortest recession	7 (1918-19)	6 (1980)
Length of longest recession	65 (1873-79)	18 (2007-2009)

Structural Stagnation

Structural stagnation is a downturn that leads to slow economic growth that prevents the economy from returning to its past trend for a long time unless the structure of the economy changes significantly.

- Unemployment is not due to temporary layoffs, as it is in a business cycle; but to longer-term changes.
- A depression is a deep and prolonged recession.

The distinction between a business cycle and structural stagnation goes to the heart of the modern macro policy debates.

Unemployment and Jobs

The **unemployment rate** is the percentage of people in the economy who are willing and able to work but who cannot find jobs.

Cyclical unemployment is that which results from fluctuations in economic activity.

Structural unemployment is that caused by the institutional structure of an economy or by economic restructuring making some skills obsolete.

Calculating the Unemployment Rate

The unemployment rate is determined by dividing the number of people who are employed by the number of people in the *labor force*.

Labor force – those people in an economy who are willing and able to do work.

For example, if the total unemployed stands at 8 million and the labor force stands at 160 million, the unemployment rate is:

- 8 million ÷ 160 million = 0.05 × 100 = 5%

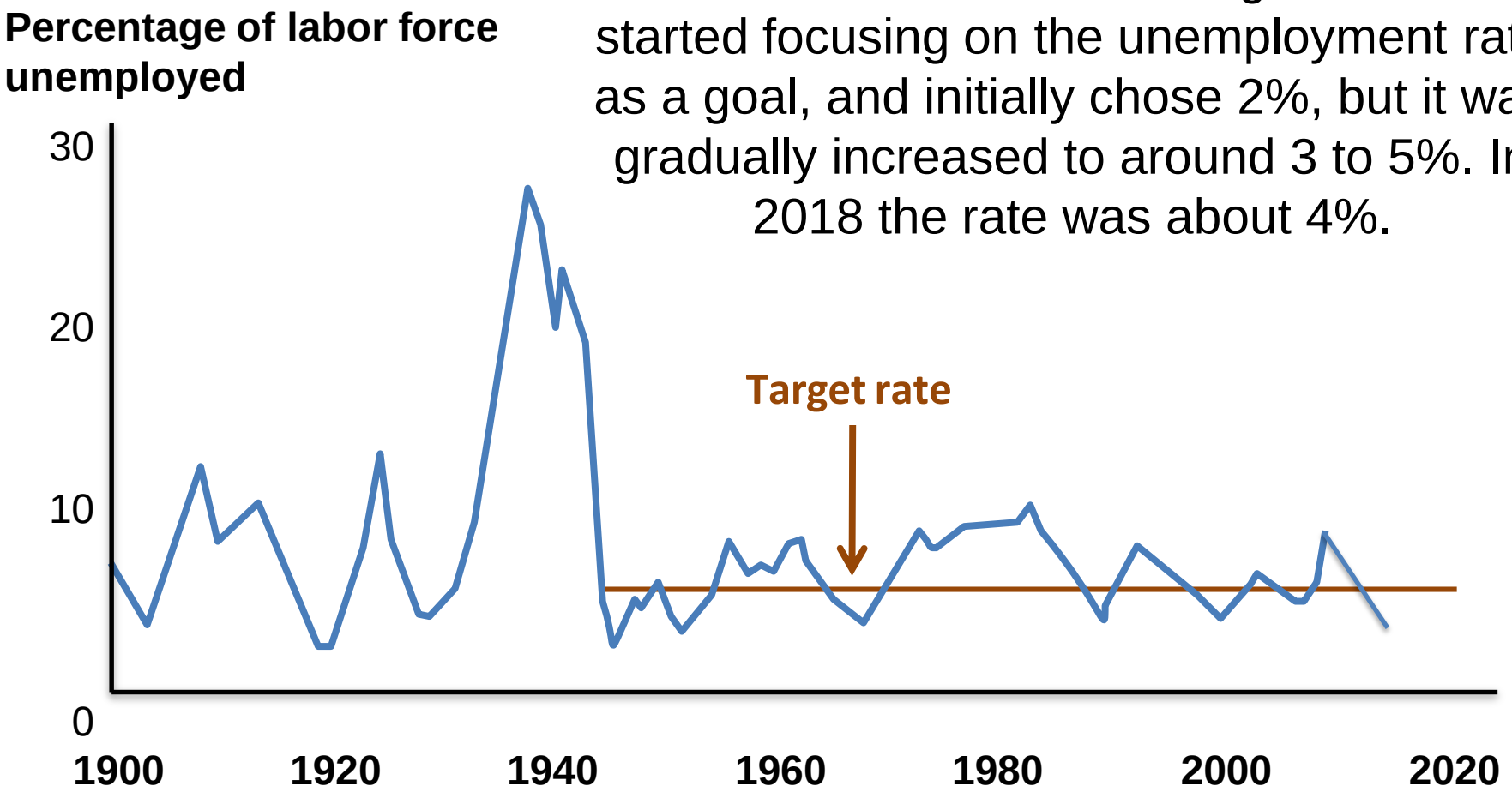
Understanding the Unemployment rate

People who would like to work but cannot (due to a disability, for example), or have become discouraged after looking for work without success, are not considered unemployed under this measure; they are categorized as outside the labor force.

This measure (U-3) is also criticized for making no distinction between those in temporary, part-time, and full-time jobs, even when part-time or temporary workers would rather work full-time but cannot due to labor market conditions.

U.S. Unemployment Rate since 1900

In the mid-1940s, the U.S. government started focusing on the unemployment rate as a goal, and initially chose 2%, but it was gradually increased to around 3 to 5%. In 2018 the rate was about 4%.



Unemployment as Government's Problem

Early capitalism had an unemployment solution: *the fear of hunger.*

As capitalism evolved, the fear of hunger was no longer an acceptable answer to unemployment.

In the Employment Act of 1946, the U.S. government took responsibility for unemployment.

Full employment is an economic climate where nearly everyone who wants a job has one.

Frictional unemployment is unemployment caused by people entering the job market and people quitting a job just long enough to look for and find another job.

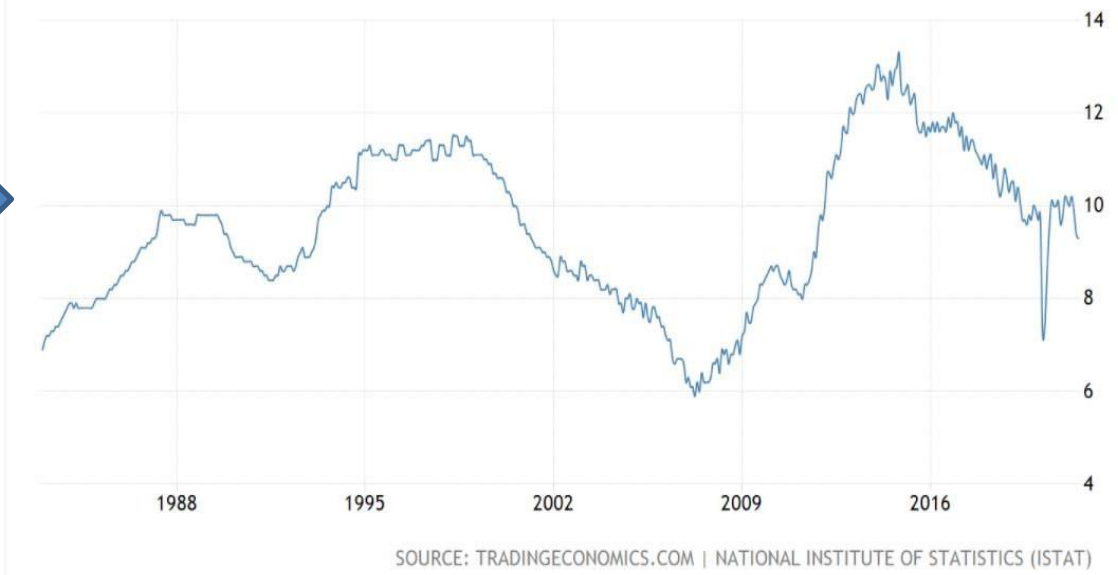
Target Rate of Unemployment

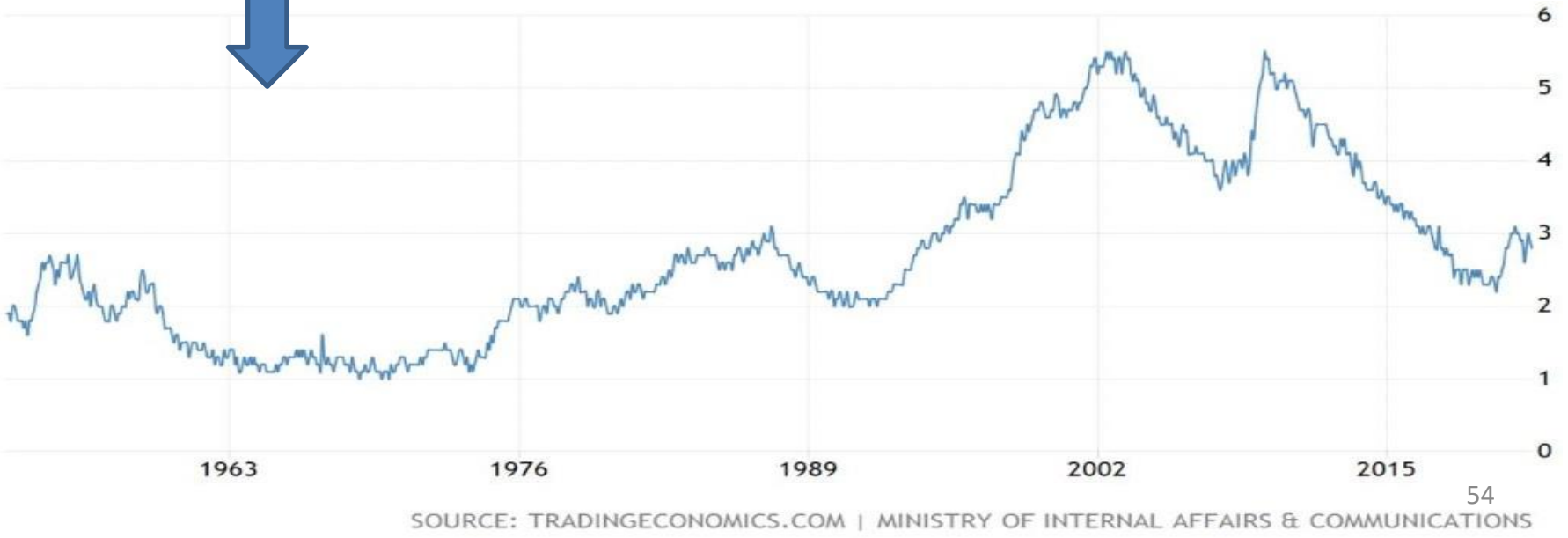
The **target rate of unemployment** is the lowest sustainable rate of unemployment that policy makers believe is achievable given existing conditions.

The appropriate target rate of unemployment has been a matter of debate.

Unemployment rate

Italy
vs
Japan





Chapter Summary (1 of 3)

Classical economists use a laissez-faire approach and focus on long-run growth while Keynesian economists use an active government approach and focus on short-run fluctuations.

Modern conventional economics has been a blend of the Keynesian and Classical approaches.

Growth is measured by the change in total output over a long period of time and the change in per capita output. Per capita output is output divided by the population.

While the secular trend growth rate has been 2.5 to 3.5 percent, some expect it to fall.

Chapter Summary (2 of 3)

Business cycles are fluctuations of real output around the secular trend growth rate. Phases of the business cycle include peak, trough, upturn, and downturn.

Structural stagnation is a cyclical downturn not expected to end soon without major changes to the structure of the economy.

Whether the economy is experiencing structural stagnation or a recession has significant implications for macroeconomic policy. Conventional macroeconomic policies can pull an economy out of a recession, but not out of a structural stagnation.

Chapter Summary (3 of 3)

Cyclical unemployment fluctuates with the business cycle. Structural unemployment is caused by economic restructuring.

The unemployment rate is calculated as the number of unemployed divided by the labor force.

The official measure of unemployment is based on judgments about who to count as employed.

The target rate of unemployment is the lowest sustainable rate of unemployment possible under existing institutions.

CHAPTER 3

Measuring and Describing the Aggregate Economy

Aggregate Accounting

Aggregate accounting (or national income accounting) is a set of rules and definitions for measuring economic activity in the economy as a whole.

Aggregate accounting is a way of measuring total, or aggregate production, expenditures, and income.

Gross domestic product (GDP) is the total market value of all final goods and services produced in an economy in a one-year period.

Calculating GDP

- Calculating GDP requires adding together millions of different services and products.
- All of the quantities of goods and services produced are multiplied by their market price per unit to determine a value measure of the good or service.
- This is weighting the importance of each good by its price.
- The sum of all of these values is GDP.

The Components of GDP

GDP is divided into four expenditure categories:

1. **Consumption (C)** is spending by households on goods and services.
2. **Investment (I)** is spending for the purpose of additional production.
3. **Government spending (G)** is goods and services that government buys. Transfer payments are not included (Social Security, etc.)
4. **Net exports** is spending on **exports (X)** minus spending on **imports (M).**

The Components of GDP

Since all production is categorized into one of these four divisions, by adding up these four categories, we get total production of U.S. goods and services

GDP = Consumption
+ Investment
+ Government spending
+ Net exports

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

Inflation: Distinguishing Real from Nominal

Inflation is a continual rise in the overall price level.

Price Index is a measure of the composite price of a specified group of goods.

Nominal GDP is the amount of goods and services produced measured at current prices.

Real GDP is the total amount of goods and services produced, adjusted for price-level changes.

Real versus Nominal GDP

GDP deflator is the price index that includes all goods and services in the economy expressed relative to a base year of 100.

Example: GDP rises 10%, from $16 trillion to $17.6 trillion. How much of that 10% is real?

If prices have risen 5%, that means the GDP deflator has increased from 100 to 105 (100 + 5).

Real GDP = $17.6 ÷ 105 × 100 = $16.76 trillion (+4.75%)

Other Real-World Price Indexes

Consumer Price Index (CPI) includes prices of goods and services sold in the retail market, i.e. the final prices which the end consumers have to pay, weighted according to each component's share of an average consumer's expenditures. It is hence also called the cost of living index. It is also used for indexing dearness allowance to employees for increase in prices.

Producer Price Index (PPI) is an index including producer or output prices which are the prices of the first commercial transactions of goods and services or the transactions at the point of first sale.

Other Real and Nominal Distinctions

Nominal interest rate is the rate you pay or receive to borrow or lend money.

Real interest rate is the nominal interest rate adjusted for inflation.

Real wealth is the value of the productive capacity of the assets of an economy measured by the goods and services it can produce now and in the future.

Nominal wealth is the value of those assets measured at their current market prices.

Asset price inflation is a rise in the price of assets unrelated to increases in their productive capacity.

Some Limitations of Aggregate Accounting

Per capita GDP can be misused in comparing various countries' living standards.

Because of differences in nonmarket activities and difference in product prices, per capita GDP may be a misleading measure of living standards.

Purchasing power parity is a method of comparing income that takes into account the different relative prices among countries.

Some Limitations of Aggregate Accounting

GDP measures neither happiness nor economic welfare.

Measuring inflation can involve significant measurement errors.

A reason is a possible misinterpretation of the components. For example, the line between consumption and investment may be unclear.

Some Limitations of Aggregate Accounting

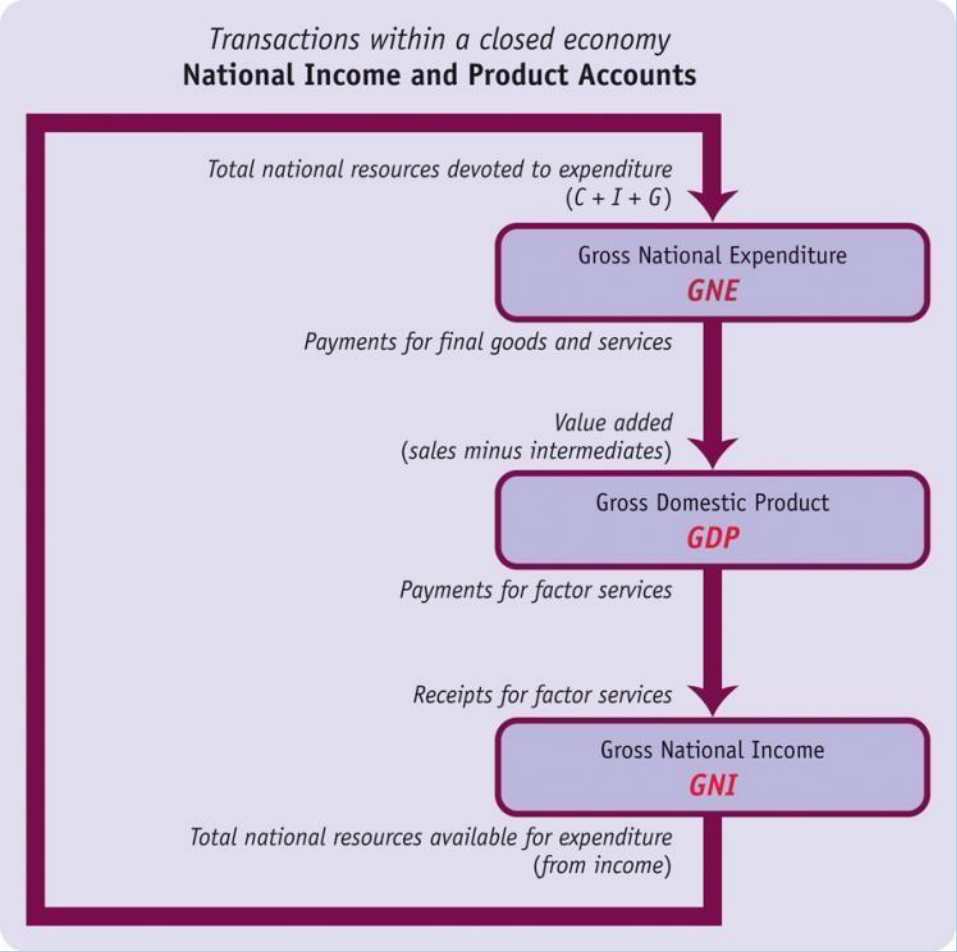
Measurement is necessary, and the GDP measurements and categories have made it possible to think and talk about the aggregate economy.

The **genuine progress indicator (GPI)** makes a variety of adjustments to GDP to better measure the progress of society rather than just economic activity.

The GPI includes social goals such as pollution reduction, education, and health.

1 Measuring Macroeconomic Activity: An Overview

FIGURE 5-1



The Closed Economy

Measurements of national expenditure, product, and income are recorded in the national income and product accounts, with the major categories shown. The purple line shows the circular flow of all transactions in a closed economy.

From GNE to GDP: Accounting for Trade in Goods and Services

- *Personal consumption expenditures* (usually called "consumption") equal total spending by private households on final goods and services. This includes nondurable goods (e.g., food), durable goods (e.g., autos), and services.

- *Gross private domestic investment* (usually called "investment") equals total spending by firms or households on final goods and services to make additions to the stock of capital. This includes construction of a new house or factory, the purchase of new equipment, and net increases in inventories of goods held by firms (i.e., unsold output).

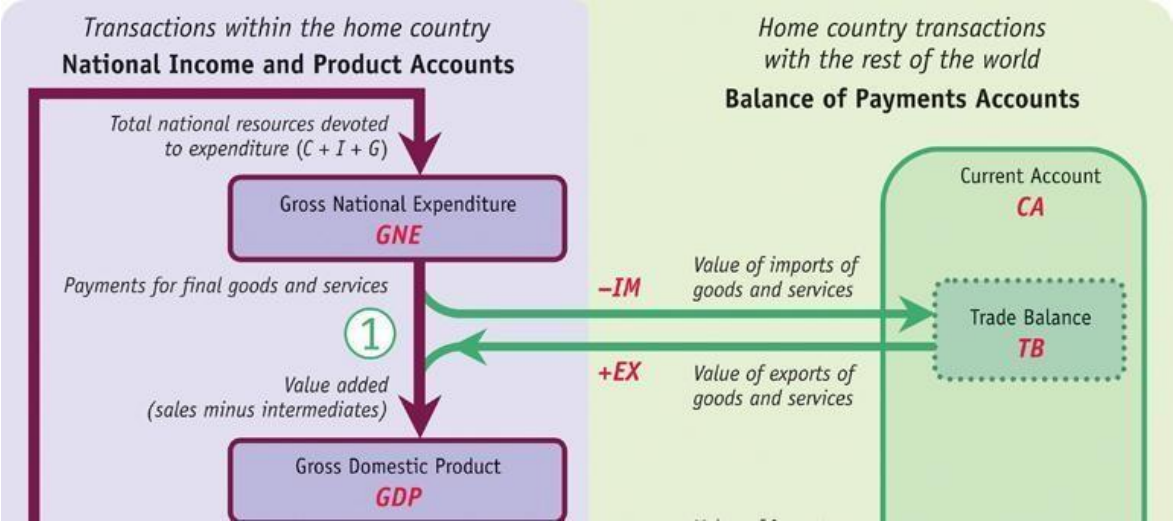
From GNE to GDP: Accounting for Trade in Goods and Services

- *Government consumption expenditures and gross investment* (often called "government consumption") equal spending by the public sector on final goods and services. This includes spending on public works, national defense, the police, and the civil service. It does *not* include any transfer payments or income redistributions, e.g., Social Security or unemployment insurance payments—these are *not* purchases of goods or services, just rearrangements of private spending power.

The Flow of Payments in an Open Economy: Incorporating the Balance of Payments Accounts

- The difference between payments made for imports and payments received for exports is called the **trade balance (TB)**, which equals net payments to domestic firms due to trade.

- GNE plus TB equals GDP, the total value of production in the home economy.



From GNE to GDP: Accounting for Trade in Goods and Services

$$GDP = \underbrace{C + I + G}_{\text{Gross national expenditure GNE}} + \underbrace{EX - IM}_{\text{Trade Balance TB}} \qquad (5\text{-}1)$$

Gross domestic product

All exports, final and intermediate

All imports, final and intermediate

This formula says gross domestic product is equal to gross national expenditure (GNE) plus the trade balance (TB).

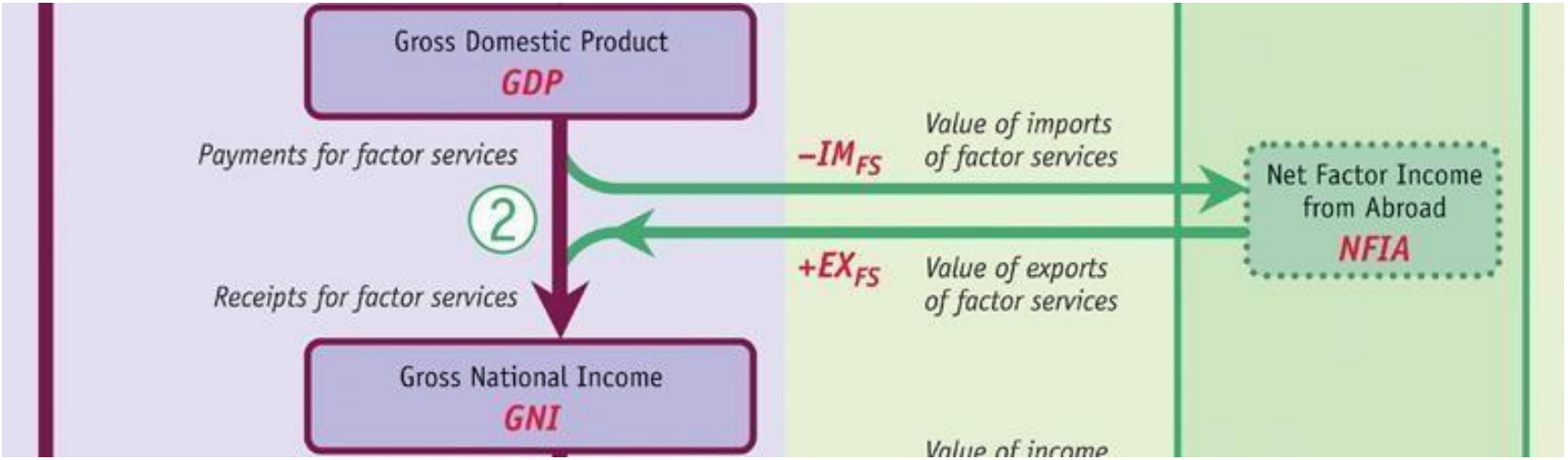
The trade balance (TB), also referred to as *net exports*, may be positive or negative.

- If $TB > 0$, exports are greater than imports and we say a country has a *trade surplus*.
- If $TB < 0$, imports are greater than exports and we say a country

has a *trade deficit*.

The Flow of Payments in an Open Economy: Incorporating the Balance of Payments Accounts

- The value of factor service exports minus factor service imports is known as **net factor income from abroad (NFIA)**, and thus GDP plus NFIA equal GNI, the total income earned by domestic entities from all sources, domestic and foreign.



From GDP to GNI: Accounting for Trade in Factor Services

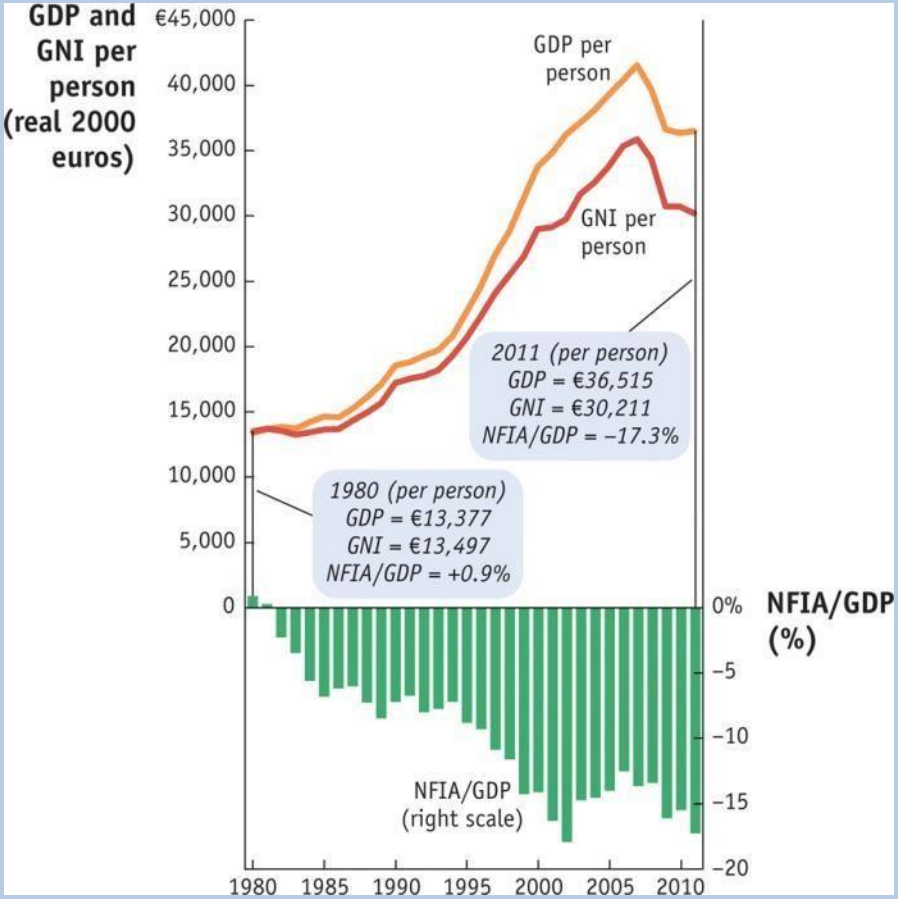
- Gross national income equals gross domestic product (GDP) plus net factor income from abroad (NFIA).

$$GNI = \underbrace{\underbrace{C + I + G}_{\text{Gross national expenditure GNE}} + \underbrace{(EX - IM)}_{\text{Trade balance TB}}}_{GDP} + \underbrace{(EX_{FS} - IM_{FS})}_{\text{Net factor income from abroad NFIA}} \quad (5\text{-}2)$$

APPLICATION

Celtic Tiger or Tortoise?

FIGURE 5-3



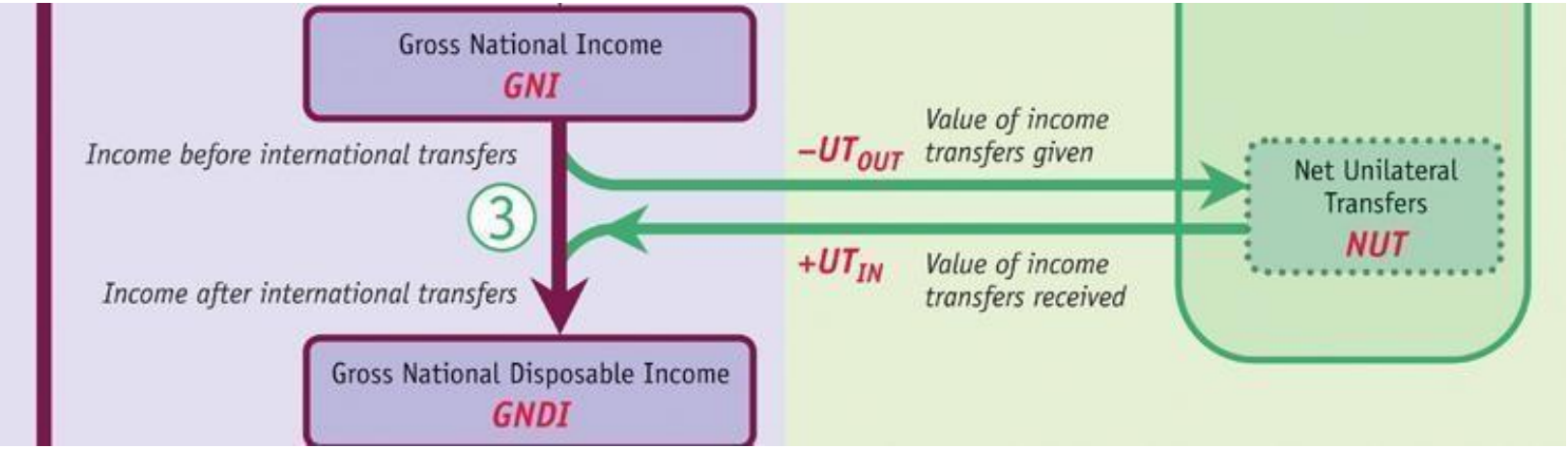
A Paper Tiger? The chart shows trends in GDP, GNI, and NFIA in Ireland from 1980 to 2011. Irish GNI per capita grew more slowly than GDP per capita during the boom years of the 1980s and 1990s because an ever-larger share of GDP was sent abroad as net factor income to foreign investors. Close to zero in 1980, this share had risen to around 15% of GDP by the year 2000 and has remained there.

The Flow of Payments in an Open Economy: Incorporating the Balance of Payments Accounts

- Gifts may take the form of income transfers or "in kind" transfers of goods and services.
- They are considered nonmarket transactions, and are referred to as *unilateral transfers.*
- **Net unilateral transfers (NUT)** equals the value of unilateral transfers the country receives from the rest of the world minus those it gives to the rest of the world.

The Flow of Payments in an Open Economy: Incorporating the Balance of Payments Accounts

- These net transfers have to be added to GNI in order to calculate **gross national disposable income (GNDI)**.
- Thus, GNI plus NUT equals GNDI, which represents the total income resources available to the home country.



From GNI to GNDI: Accounting for Transfers of Income

If a country receives transfers worth UT_{IN} and gives transfers worth UT_{OUT}, then its net unilateral transfers (NUT) are

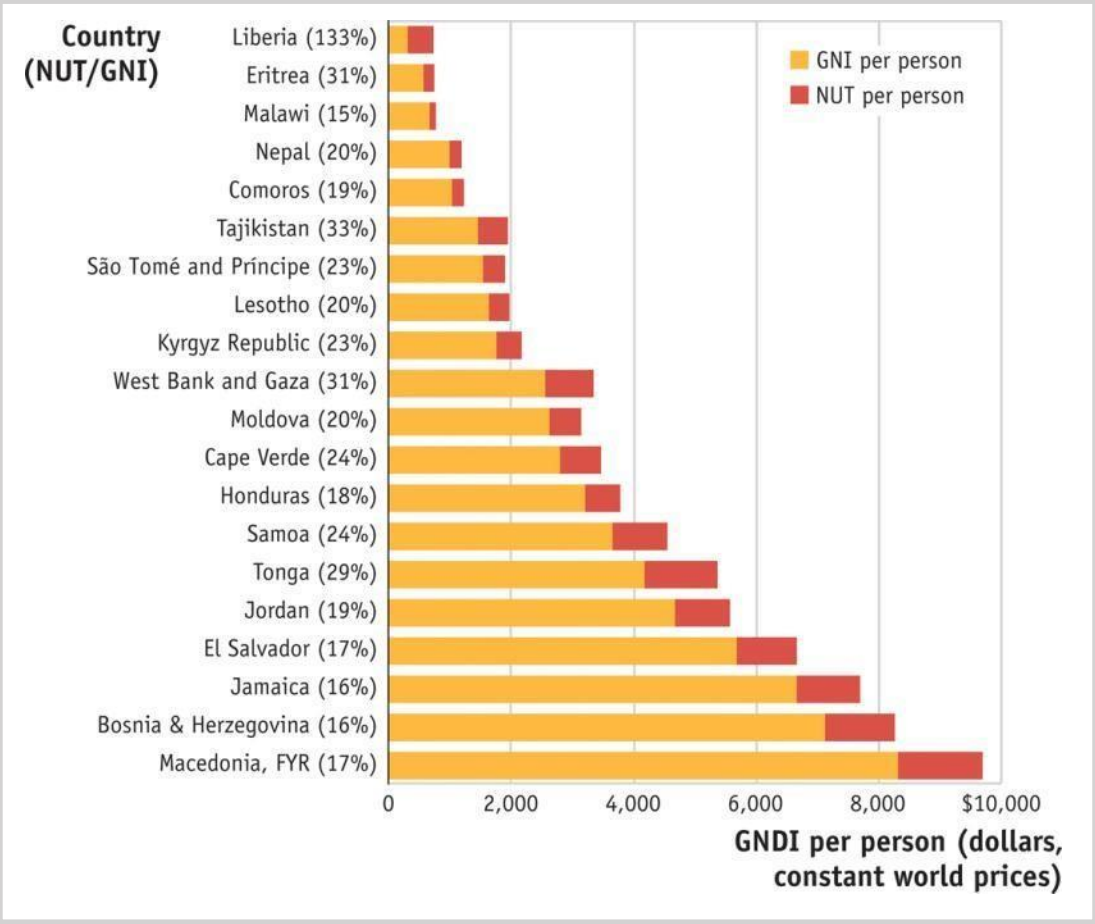
$$NUT = UT_{IN} - UT_{OUT}$$

Adding net unilateral transfers to gross national income gives a full measure of national income in an open economy, known as gross national disposable income (GNDI), henceforth Y:

$$\underbrace{Y}_{GNDI} = \underbrace{\underbrace{C + I + G}_{GNE} + \underbrace{(EX - IM)}_{\substack{\text{Trade balance} \\ (TB)}} + \underbrace{(EX_{FS} - IM_{FS})}_{\substack{\text{Net factor income from abroad} \\ (NFIA)}}}_{GNI} + \underbrace{(UT_{IN} - UT_{OUT})}_{\substack{\text{Net unilateral transfers} \\ (NUT)}} \quad (5\text{-}3)$$

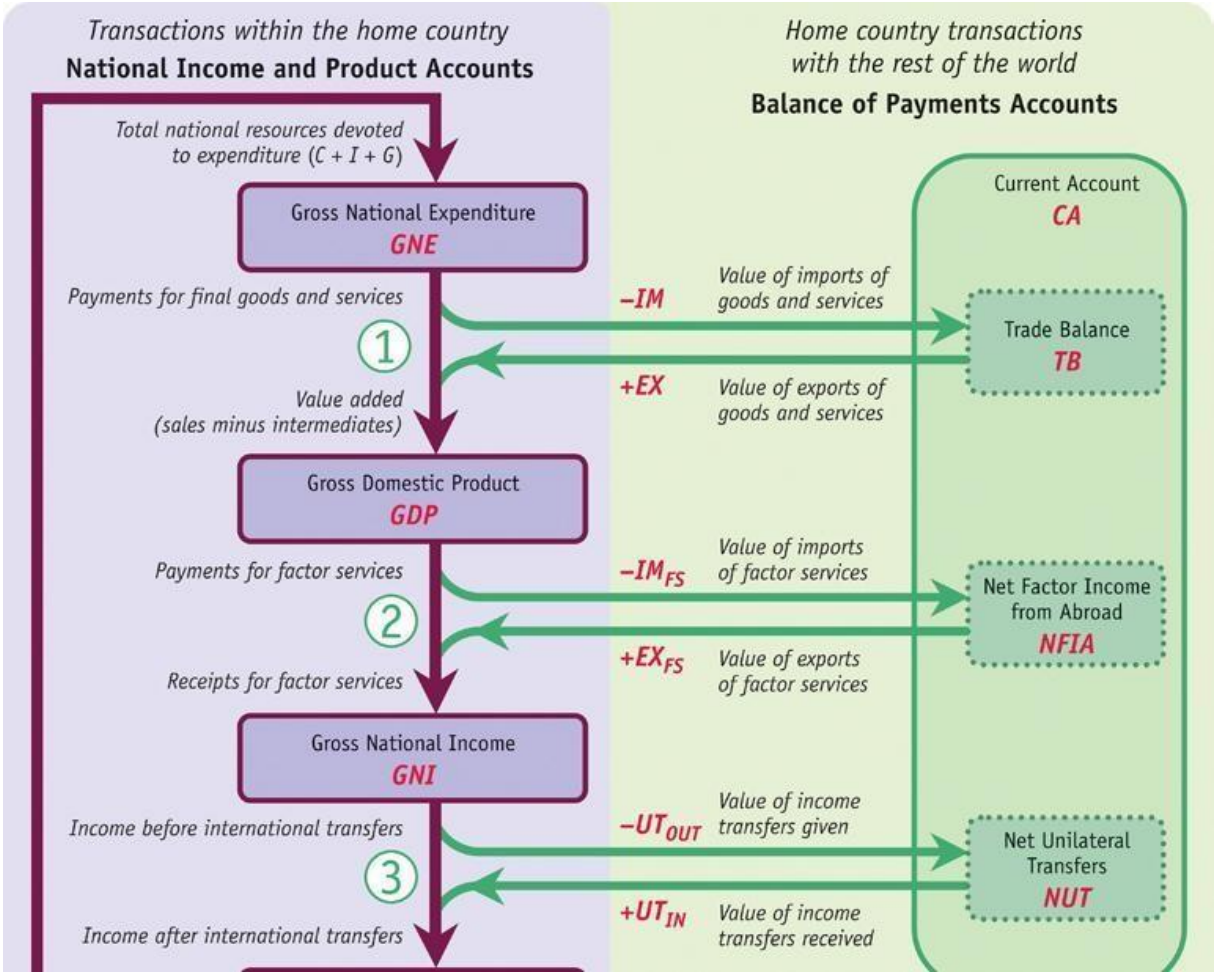
From GNI to GNDI: Accounting for Transfers of Income

FIGURE 5-4



Major Transfer Recipients The chart shows average figures for 2000 to 2010 for all countries in which net unilateral transfers exceeded 15% of GNI. Many of the countries shown were heavily reliant on foreign aid, including some of the poorest countries in the world, such as Liberia, Eritrea, Malawi, and Nepal. Some countries with higher incomes also have large transfers because of substantial migrant remittances from a large number of emigrant workers overseas (e.g., Tonga, El Salvador, Honduras, and Cape Verde).

The Flow of Payments in an Open Economy: Incorporating the Balance of Payments Accounts



The **current account (CA)** is a tally of all international transactions in goods, services, and income (occurring through market transactions or transfers).

What the National Economic Aggregates Tell Us

$$\underbrace{Y}_{GNDI} = \underbrace{C + I + G}_{GNE} + \underbrace{\left\{ \underbrace{(EX + IM)}_{\substack{\text{Trade} \\ \text{balance} \\ (TB)}} + \underbrace{(EX_{FS} - IM_{FS})}_{\substack{\text{Net factor income} \\ \text{from abroad} \\ (NFIA)}} + \underbrace{(UT_{IN} - UT_{OUT})}_{\substack{\text{Net unilateral} \\ \text{transfers} \\ (NUT)}} \right\}}_{\text{Current Account } (CA)} \quad (5\text{-}4)$$

- On the left is our full income measure, GNDI.
- The first term on the right is GNE, which measures payments by home entities.
- The remaining terms measure net payments to the home country from all international transactions in goods, services, and income. We group the three cross-border terms into an umbrella term that is called the current account (CA).

What the Current Account Tells Us

$$Y = C + I + G + CA \qquad (5\text{-}5)$$

- This equation is the open-economy **national income identity**. It tells us that the current account represents the difference between national income Y (or GNDI) and gross national expenditure GNE (or $C + I + G$). Hence:
  - *GNDI is greater than GNE if and only if CA is positive, or in surplus.*
  - *GNDI is less than GNE if and only if CA is negative, or in deficit.*

What the Current Account Tells Us

- The current account is also the difference between **national saving** ($S = Y - C - G$, by definition) and investment:

$$S = I + CA \qquad (5\text{-}6)$$

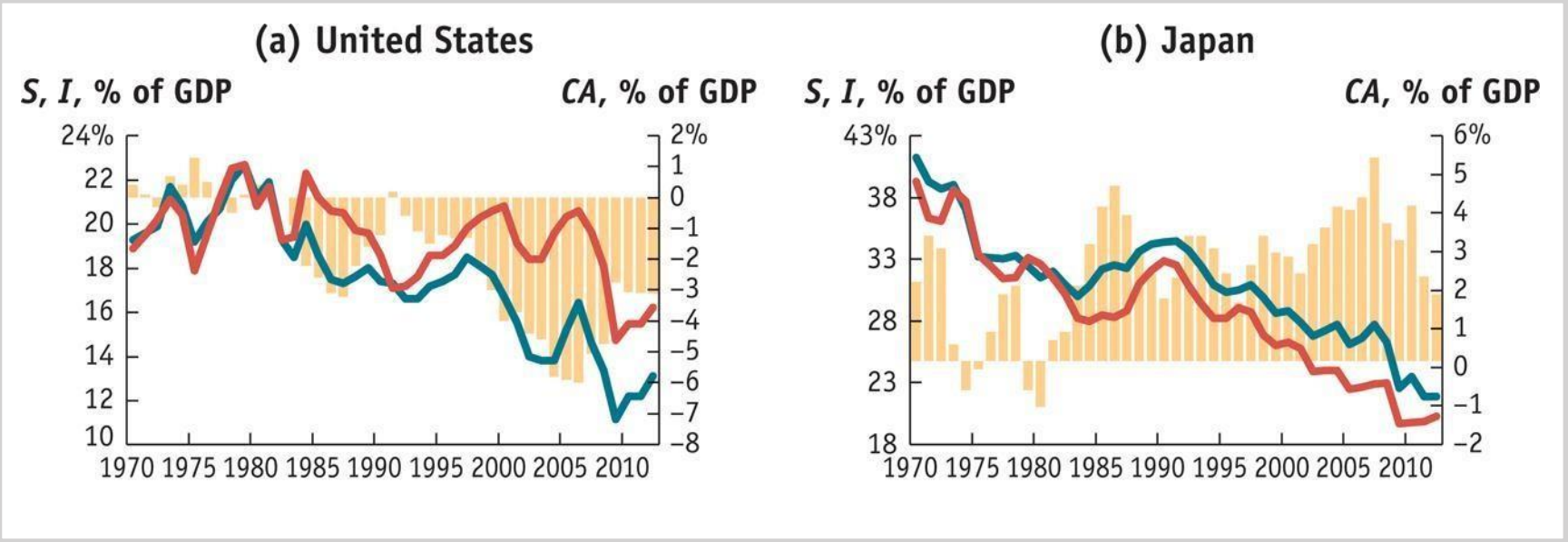
$Y-C-G$

- This equation, often written as $CA = S - I$, is called the **current account identity** even though it is just a rearrangement of the national income identity. Thus,
  - *S is greater than I if and only if CA is positive, or in surplus.*
  - *S is less than I if and only if CA is negative, or in deficit.*

APPLICATION

Global Imbalances

F GURE 5-7 (1 of 2) Saving, Investment, and Current Account Trends: Industrial Countries



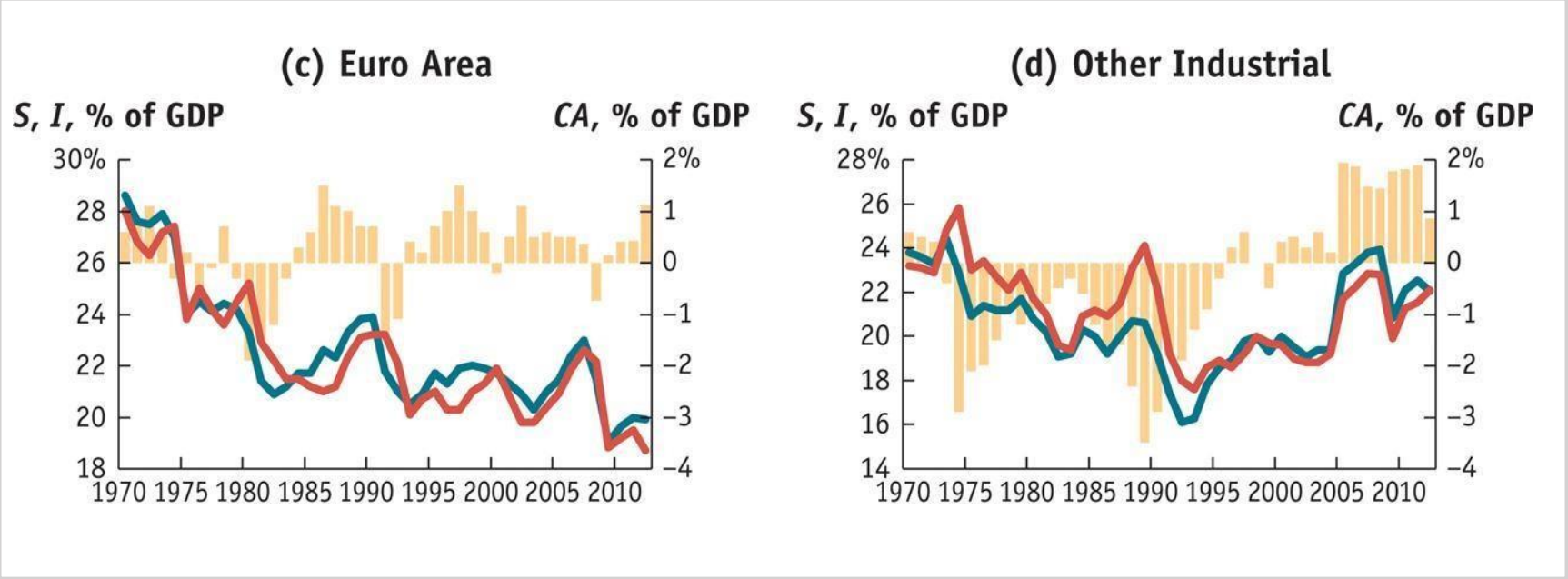
The charts show saving, investment, and the current account as a percent of each sub-region's GDP for four groups of advanced countries. The United States has seen both saving and investment fall since 1980, but saving has fallen further than investment, opening up a large current account deficit approaching 6% of GDP in recent years.

Japan's experience is the opposite: Investment fell further than saving, opening up a large current account surplus of about 3% to 5% of GDP.

APPLICATION

Global Imbalances

F GURE 5-7 (2 of 2) Saving, Investment, and Current Account Trends: Industrial Countries (continued)

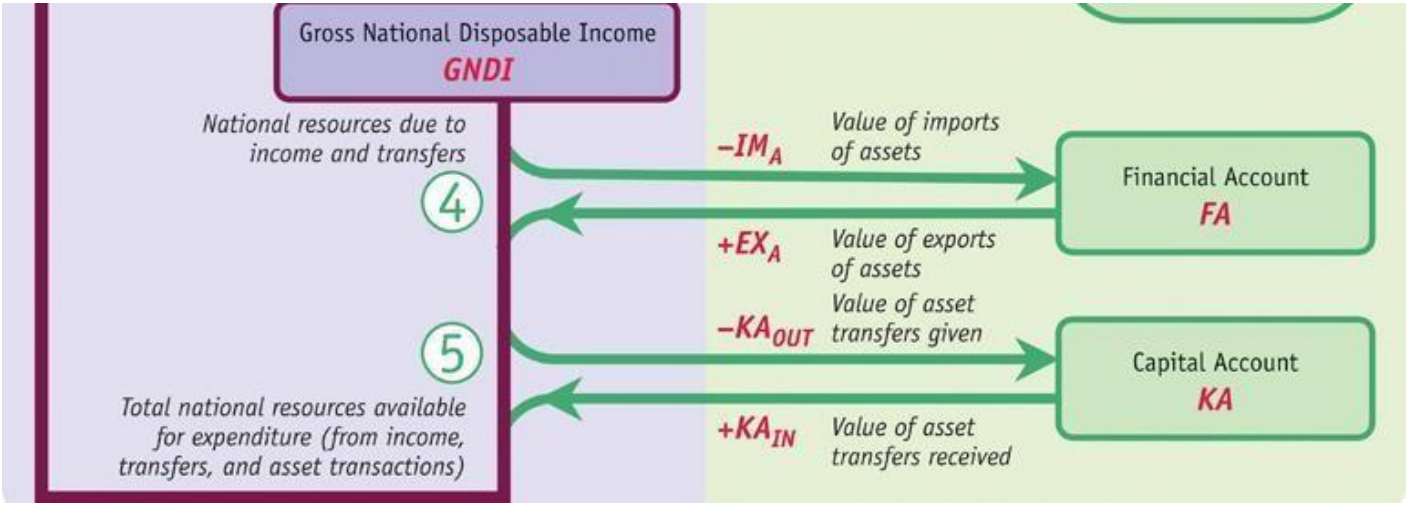


The Euro area has also seen saving and investment fall but has been closer to balance overall.

Other advanced countries (e.g., non-Euro area EU countries, Canada, Australia, etc.) have tended to run large current account deficits.

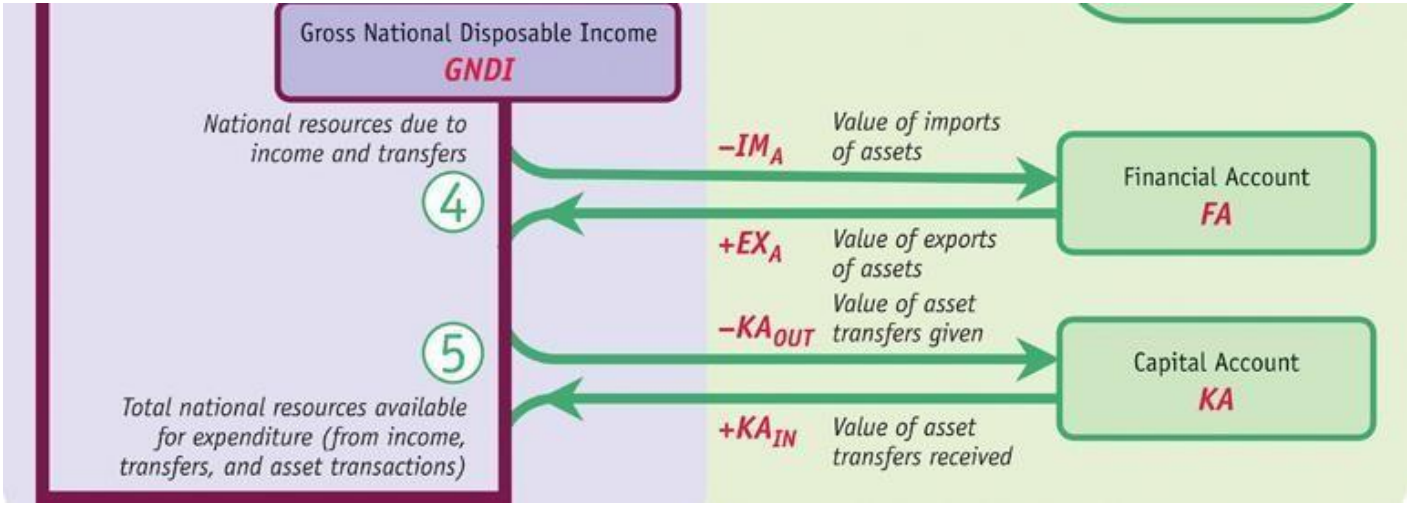
The Flow of Payments in an Open Economy: Incorporating the Balance of Payments Accounts

- The value of asset exports minus asset imports is called the **financial account (FA)**.
- These net asset exports are added to home GNDI when calculating the total resources available for expenditure in the home country.



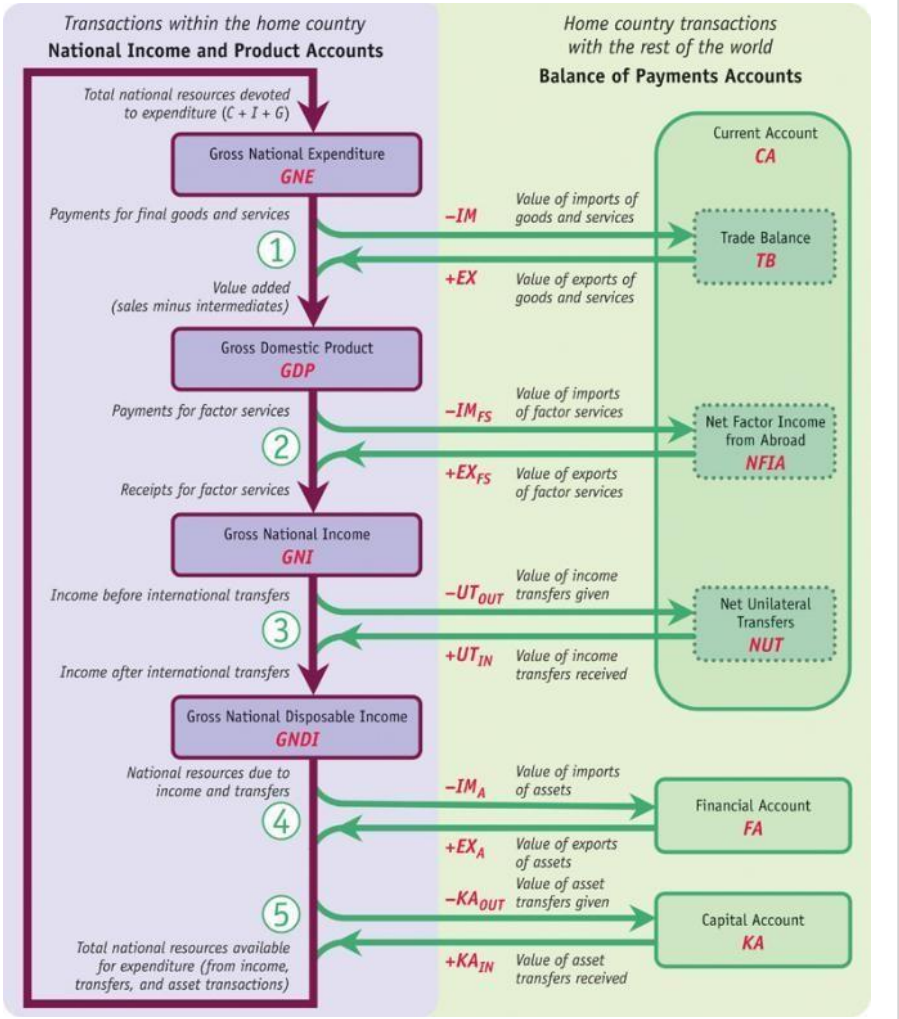
The Flow of Payments in an Open Economy: Incorporating the Balance of Payments Accounts

- A country may not only buy and sell assets but also transfer assets as gifts.
- Such asset transfers are measured by the **capital account** (**KA**), which is the value of capital transfers from the rest of the world minus those to the rest of the world.



1 Measuring Macroeconomic Activity: An Overview

FIGURE 5-2



The Open Economy Measurements of national expenditure, product, and income are recorded in the national income and product accounts, with the major categories shown on the left.

Measurements of international transactions are recorded in the balance of payments accounts, with the major categories shown on the right.

The purple line shows the flow of transactions within the home economy.

The green lines show all cross-border transactions.

Accounting for Asset Transactions: The Financial Account

- The financial account (FA) records transactions between residents and nonresidents that involve financial assets. This definition covers all types of assets:
  - Real assets such as land or structures
  - Financial assets such as debt (bonds, loans) or equity issued by any entity
- Subtracting asset imports from asset exports yields the home country's net overall balance on asset transactions, which is known as the financial account, where $FA = EX_A - IM_A$.
- The financial account therefore measures how the country accumulates or decumulates assets through international transactions.

Accounting for Asset Transactions: The Capital Account

- The capital account (KA) covers two remaining areas of asset movement, both of minor quantitative significance:
  1. Capital transfers (i.e., gifts of assets), an example of which is the forgiveness of debts
  2. The acquisition and disposal of nonfinancial, nonproduced assets (e.g., patents, copyrights, trademarks)
- We denote capital transfers received by the home country as KA_{IN} and capital transfers given by the home country as KA_{OUT}. The capital account, $KA = KA_{IN} - KA_{OUT}$, denotes net capital transfers received, and is typically small in magnitude.

How the Balance of Payments Accounts Work: A Macroeconomic View

- Adding the last two expressions, we have the value of the total resources available to the home country for expenditures. This total value is equal to the total value of home expenditure on final goods and services, GNE:

$$\underbrace{GNE + CA}_{\text{Resources available to home country due to income}} + \underbrace{FA + KA}_{\text{Extra resources available to the home country due to asset trades}} = GNE$$

- Cancelling GNE from both sides, we obtain a result known as the **balance of payments identity** or **BOP identity**:

$$\underbrace{CA}_{\text{Current account}} + \underbrace{KA}_{\text{Capital account}} + FA$$

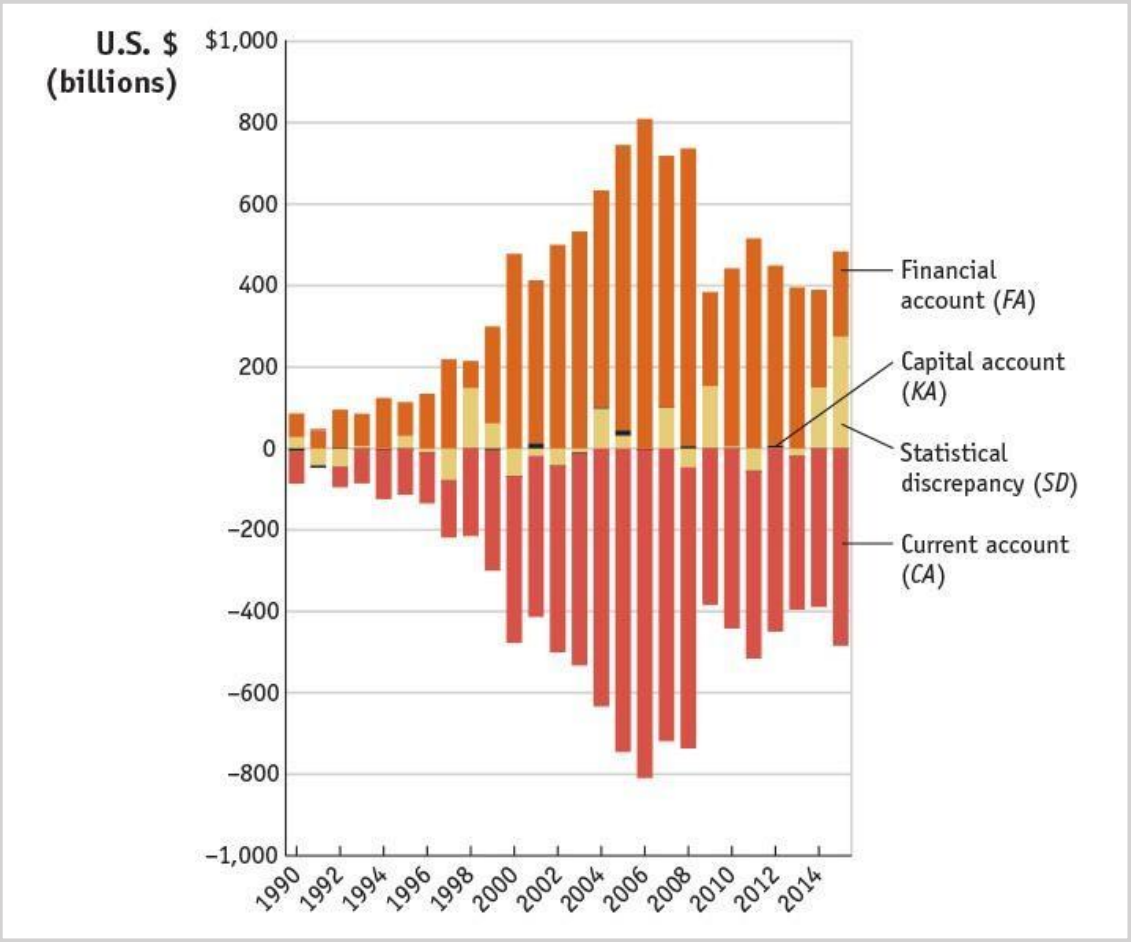
3 The Balance of Payments

Financial account $= 0$ (5-12)

3 The Balance of Payments

Some Recent Trends in the U.S. Balance of Payments

FIGURE 5-10



U.S. Balance of Payments and Its Components, 1990–2015

The figure shows the current account balance (*CA*), the capital account balance (*KA*, barely visible), the financial account balance (*FA*), and the statistical discrepancy (*SD*), in billions of dollars.

An Example: US CA deficit

GNE = C+ I + G = 100

TB = -25 => GDP = GNE + TB = 75

NFIA = 5 => GNI = GDP + NFIA =

80

NUT = 0 => GNDI = GNI = GNE + CA =

80CA = GNDI – GNE = -20

BOP = CA + FA (Hp: KA=0) = 0 => FA = +20

Expenditure > Disposable Income

To finance expenditures above income, domestic agents

1 Exchange Rate Essentials

(C,I,G) have exported (sold) financial assets, like bonds orequity, in exchange for money to spend.

An exchange rate (E) is the price of some foreign currency expressed in terms of a home (or domestic) currency.

- Because an exchange rate is the relative price of two currencies, it may be quoted in either of two ways:
  - The number of home currency units that can be exchanged for one unit of foreign currency
  - The number of foreign currency units that can be exchanged for one unit of home currency
- *To avoid confusion, we must specify which country is the*

home country and which is foreign.

1 Exchange Rate Essentials

Defining the Exchange Rate

When we refer to a particular country's exchange rate, we will quote it in units of home currency per units of foreign currency.

- For example:
  - The U.S. exchange rate with Japan is quoted as U.S. dollars per yen (or $/¥).
  - Denmark's exchange rate with the Eurozone is quoted as Danish krone per euro (or kr/€).

1 Exchange Rate Essentials

TABLE 2-1

Exchange Rate Quotations This table shows major exchange rates as they might appear in the financial media. Columns (1) to (3) show rates on December 31, 2015. For comparison, columns (4) to (6) show rates on December 31, 2014. For example, column (1) shows that at the end of 2015, one U.S. dollar was worth 1.501 Canadian dollars, 6.870 Danish krone, 0.921 euros, and so on. The euro–dollar rates appear in bold type.

		EXCHANGE RATES ON DECEMBER 31, 2015			EXCHANGE RATES ON DECEMBER 31, 2014 *ONE YEAR PREVIOUSLY*		
		(1)	(2)	(3)	(4)	(5)	(6)
Country (currency)	**Currency Symbol**	**Per $**	**Per €**	**Per £**	**Per $**	**Per €**	**Per £**
Canada (dollar)	C$	1.501	1.389	2.047	1.158	1.402	1.806
Denmark (krone)	DKr	6.870	7.463	10.13	6.154	7.446	9.595
Eurozone (euro)	€	**0.921**	—	1.357	**0.826**	—	1.289
Japan (yen)	¥	120.3	130.7	177.3	119.9	145.1	187.0
Norway (krone)	NKr	8.851	9.612	13.05	7.498	9.072	11.69
Sweden (krona)	SKr	8.431	9.158	12.43	7.828	9.473	12.21
Switzerland (franc)	SFr	1.001	1.087	1.485	0.994	1.202	1.549
United Kingdom (pound)	£	0.679	0.737	—	1.559	0.776	—
United States (dollar)	$	—	**1.086**	1.474	—	**1.210**	1.559

$E_{\$/€}$ = 1.086 = U.S. exchange rate (American terms)

$E_{€/\$}$ = 0.921 = Eurozone exchange rate (European terms)

$$E_{\$/€} = \frac{1}{E_{€/\$}} \qquad 1.086 = \frac{1}{0.921}$$

Appreciations and Depreciations

- If one currency buys more of another currency, we say it has experienced an **appreciation**.
  - We also might say it has *risen in value*, *appreciated*, or *strengthened* against the other currency.
- If a currency buys less of another currency, we say it has experienced a **depreciation**.
  - We also might say it has *fallen in value*, *depreciated*, or *weakened* against the other currency.

Appreciations and Depreciations

In U.S. terms, the following holds true:

- When the U.S. exchange rate $E_{\$/€}$ *rises*, more dollars are needed to buy one euro. The price of one euro goes up in dollar terms, and the U.S. dollar experiences a depreciation. It has fallen in value or weakened against the euro.

- When the U.S. exchange rate $E_{\$/€}$ *falls*, fewer dollars are needed to buy one euro. The price of one euro goes down in dollar terms, and the U.S. dollar experiences an appreciation. It has risen in value or strengthened against the euro.

Appreciations and Depreciations

To determine the size of an appreciation or depreciation, we compute the proportional change, as follows:

- In 2014, at time *t*, the dollar value of the euro was
  $E_{\$/€,t} = \$\ 1.211.$
- In 2015, at time $t + 1$, the dollar value of the euro was
  $E_{\$/€,t+1} = \$\ 1.086.$
- The change in the dollar value of the euro was
  $\Delta E_{\$/€,t} = 1.086 - 1.211 = -\$\ 0.125.$
- The percentage change was
  $\Delta E_{\$/€,t} / E_{\$/€,t} = -0.125/1.211 = -10.32\%.$
- Thus, the dollar *appreciated* against the euro by 10.32%.

Appreciations and Depreciations

Similarly, over the same year:

- In 2014, at time *t*, the euro value of the dollar was
  $E_{€/\$,t} = € 0.826.$
- In 2015, at time $t + 1$, the euro value of the dollar was
  $E_{€/\$,t+1} = € 0.921.$
- The change in the euro value of the dollar was
  $\Delta E_{€/\$,t} = 0.921 - 0.826 = + € 0.095.$
- The percentage change was
  $\Delta E_{€/\$,t} / E_{€/\$,t} = + 0.095/0.826 = + 11.50\%.$
- Thus, the euro *depreciated* against the dollar by 11.50%.

2 Exchange Rates in Practice

Exchange Rate Regimes: Fixed Versus Floating

There are two major types of **exchange rate regimes**—fixed and floating:

- A **fixed** (or **pegged**) **exchange rate** fluctuates in a narrow range (or not at all) against some *base currency* over a sustained period. The exchange rate can remain fixed for long periods only if the government intervenes in the foreign exchange market in one or both countries.
- A **floating** (or **flexible**) **exchange rate** fluctuates in a wider range, and the government makes no attempt to fix it against any base currency. Appreciations and depreciations may occur yearly, monthly, by the day, or even every minute.

APPLICATION

FIGURE 2-2 (2 of 2) Exchange Rate Behavior: Selected Developed Countries, 1996–2015 (cont.)

This figure shows exchange rates of three currencies against the euro, which was introduced in 1999. The pound and the yen float against the euro. The Danish krone provides an example of a fixed exchange rate. There is only a tiny variation around this rate, no more than plus or minus 2%. This type of fixed regime is known as a **band**.

2 Exchange Rates in Practice

How the Euro is quoted

- 8 September, €1 = $1.18

- The convention in Economics is: #?H/1F (also called *direct quote*). It makes sense: “buy low, sell high” (the F-currency)
- If Home is EA, then E(€/$) = 1/1.18€ for 1$ = 0.8475 €/$

- However, the euro is usually quoted as #?F/1H (also called *direct quote*).
- In this case, E(€/$) = 1.18$/1€ or simply 1.18$.

Consumption

- The simplest model of aggregate private consumption relates household **consumption** C to **disposable income** Y^d.

$$Consumption = C = C(Y - \overline{T})$$

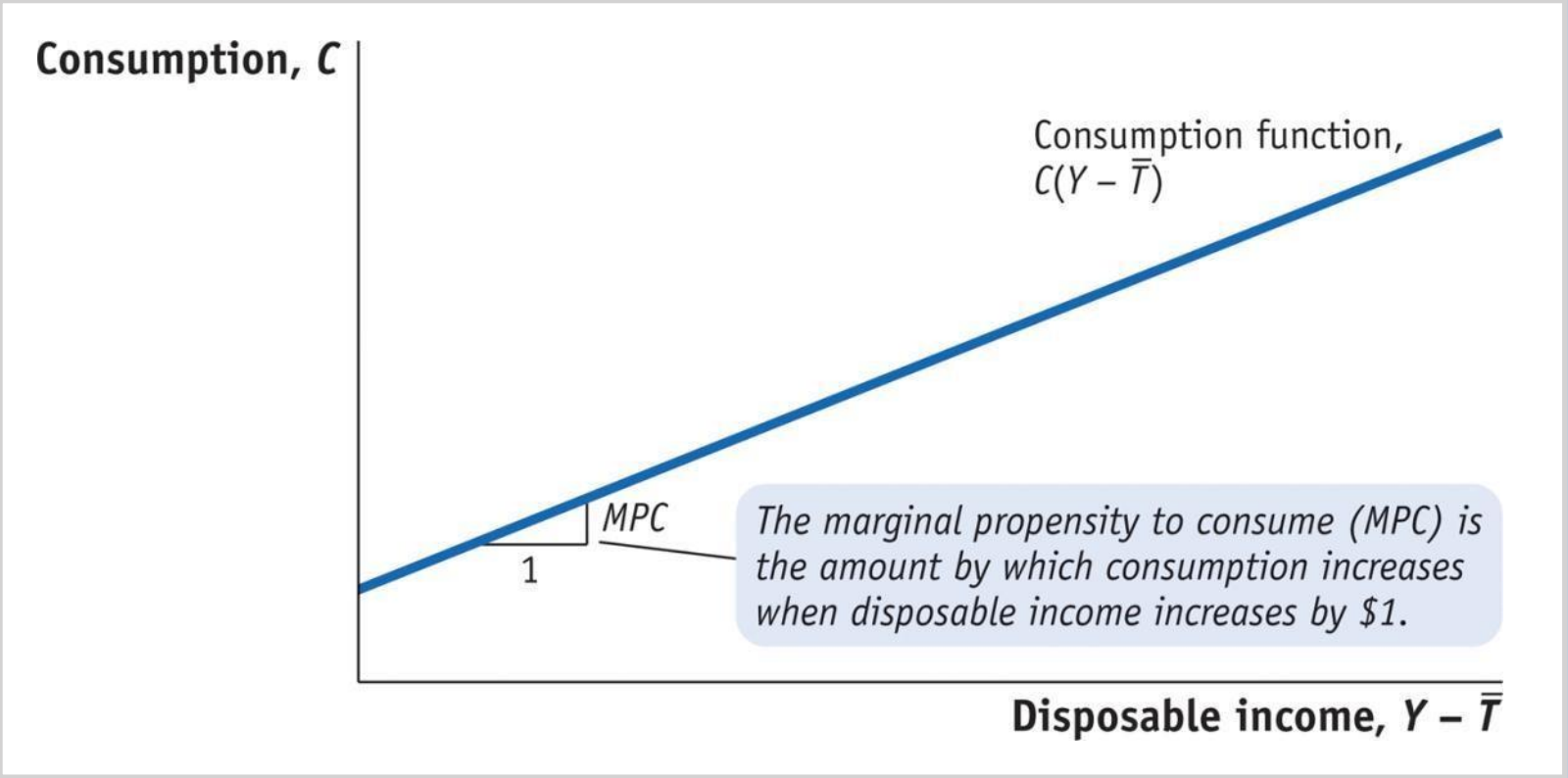
- This equation is known as the *Keynesian consumption function.*

Marginal Effects The slope of the consumption function is called the **marginal propensity to consume** (*MPC*). We can also define the *marginal propensity to save* (*MPS*) as $1 - MPC$.

1 Demand in the Open Economy

Consumption

FIGURE 7-1



The Consumption Function The consumption function relates private consumption, C, to disposable income, $Y - \bar{T}$. The slope of the function is the marginal propensity to consume, *MPC*.

Investment

- The firm's borrowing cost is the **expected real interest rate** r^e, which equals the nominal interest rate i minus the expected rate of inflation π^e:

$$r^e = i - \pi^e.$$

- Since expected inflation is zero, the expected real interest rate equals the nominal interest rate, $r^e = i$.

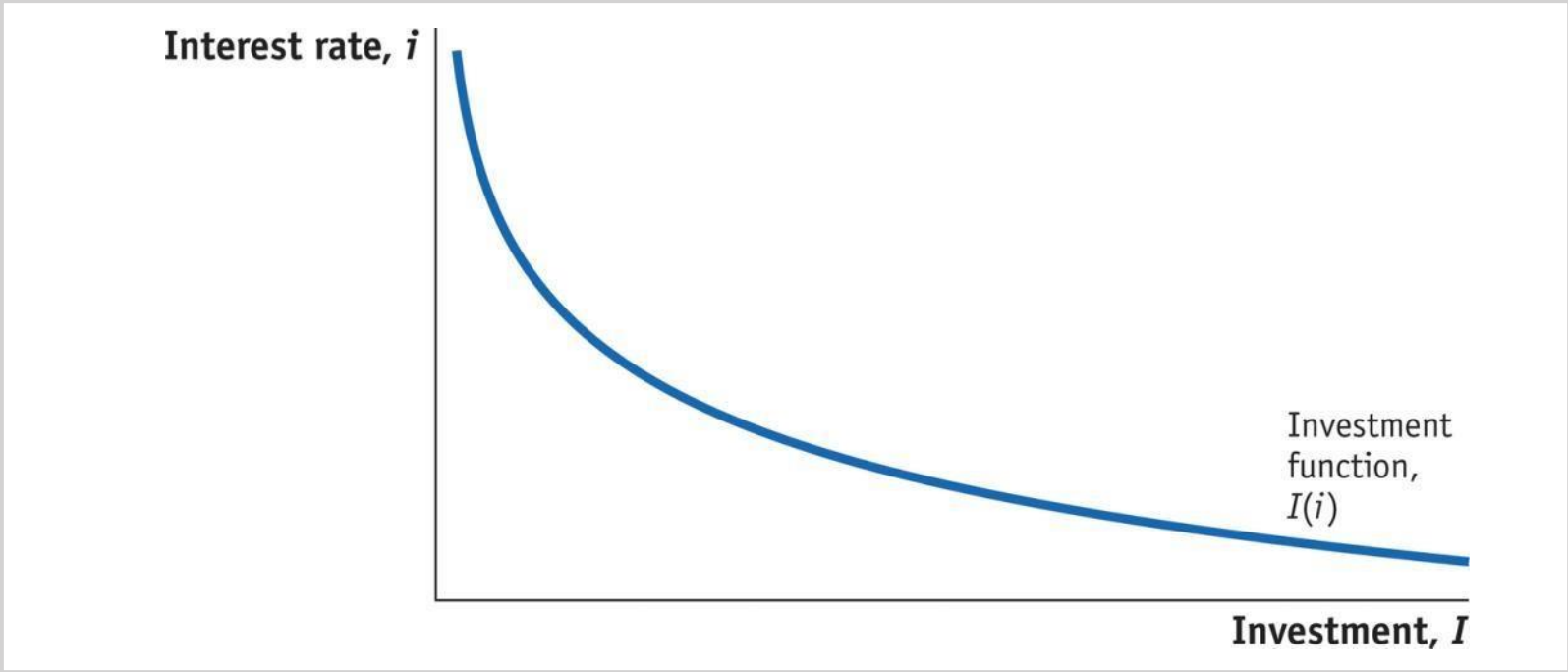
- Investment I is a decreasing function of the real interest rate. So investment $I(r)$ falls as the real interest rate rises.

- But expected inflation is zero, so the real interest rate equals the nominal interest rate. We can then write $I(i)$.

1 Demand in the Open Economy

Investment

FIGURE 7-2



The Investment Function The investment function relates the quantity of investment, I, to the level of the expected real interest rate, which equals the nominal interest rate, i, when (as assumed in this chapter) the expected rate of inflation, π^e, is zero. The investment function slopes downward: as the real cost of borrowing falls, more investment projects are profitable.

The Government

- Assume that the government collects an amount $\bar{T}$ of **taxes** from households and spends an amount G on **government consumption**.
- We will ignore government **transfer programs**, such as social security, medical care, or unemployment benefit systems.
- In the unlikely event that $G = \bar{T}$ exactly, we say that the government has a *balanced budget.*
- If $\bar{T} > G$, the government is said to be running a *budget surplus*

(of size $\bar{T} - G$).

- If $G > \bar{T}$, there is a *budget deficit* (of size $-\bar{T}$ or, equivalently, a negative surplus of $\bar{T} - G$).

The Trade Balance

The Role of the Real Exchange Rate

- When aggregate spending patterns change due to changes in the real exchange rate, this is **expenditure switching** from foreign purchases to domestic purchases.
- If home's exchange rate is E, and home and foreign price levels are $\bar{P}$ and $\bar{P}^*$ (both fixed in the short run), the real exchange rate q of Home is defined as $q = E\,\bar{P}^* / \bar{P}$.
  - *We expect the trade balance of the home country to be an increasing function of the home country's real exchange*

rate. As the home country's real exchange rate rises, it will export more and import less, and the trade balance rises.

The Trade Balance

The Role of Income Levels

- *We expect an increase in home income to be associated with an increase in home imports and a fall in the home country's trade balance.*
- *We expect an increase in rest of the world income to be associated with an increase in home exports and a rise in the home country's trade balance.*

- The trade balance is, therefore, a function of three variables: the real exchange rate, home disposable income, and rest of world disposable income.

$$TB = TB\left(\underbrace{\bar{E}\bar{P}^{*}/\bar{P}}, \underbrace{Y - \bar{T}}, \underbrace{Y^{*} - \bar{T}^{*}}\right)$$

Increasing f u

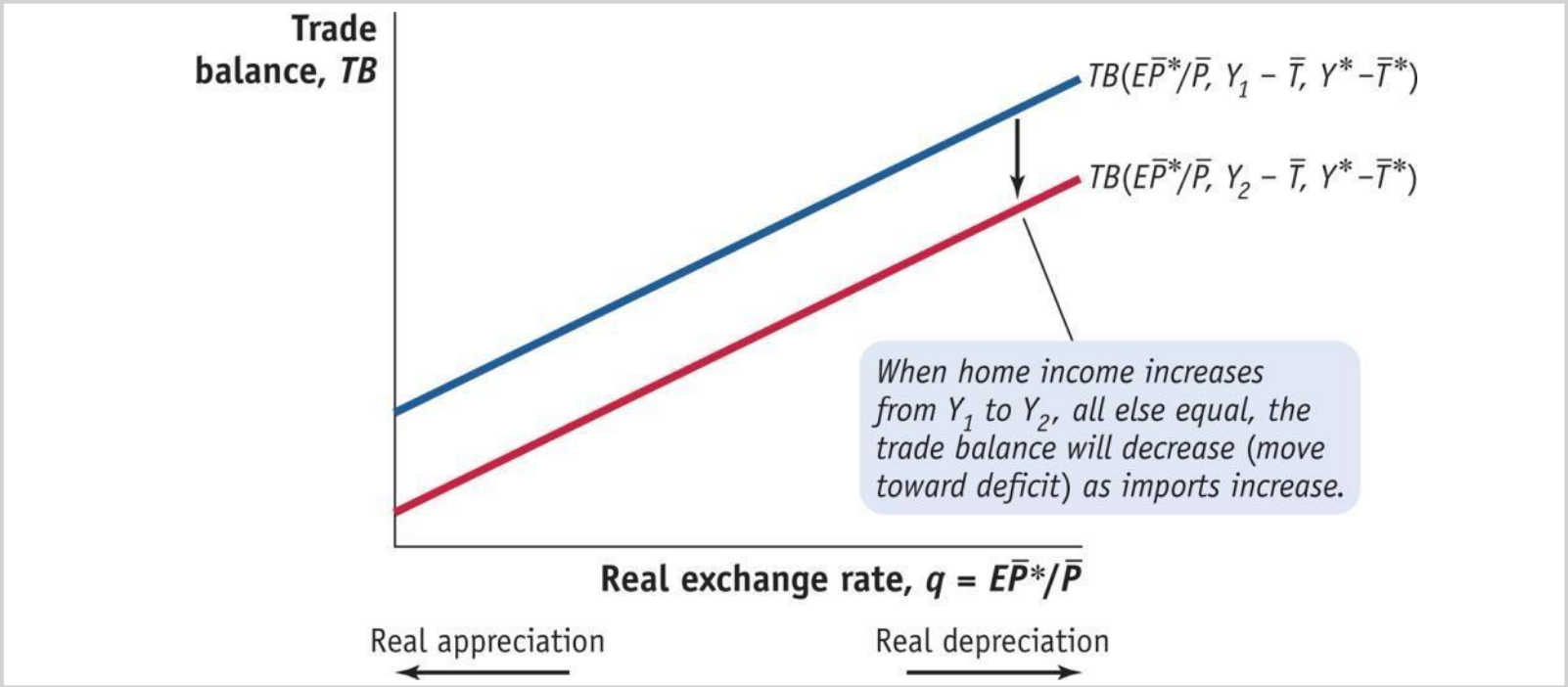
1 Demand in the Open Economy

tion Decreasing function Increasing function

1 Demand in the Open Economy

The Trade Balance

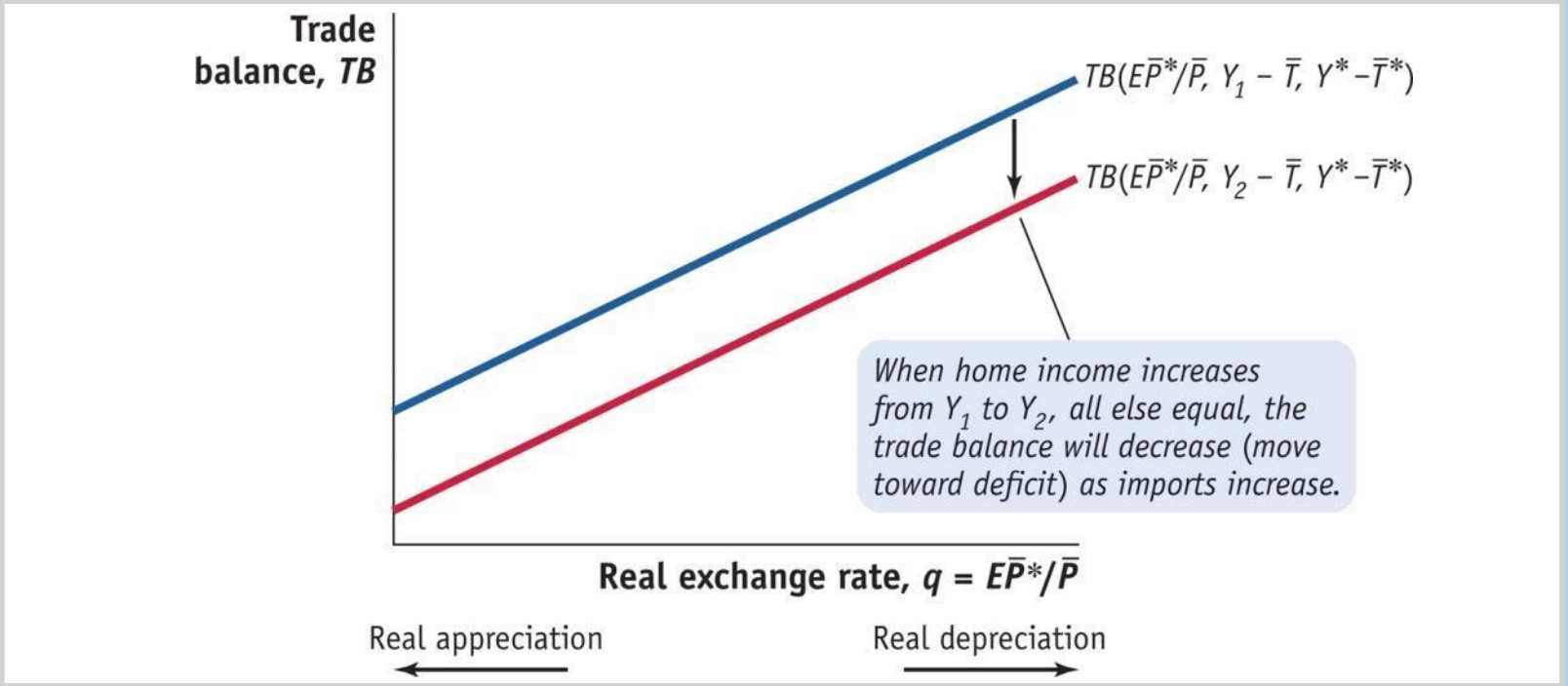
FIGURE 7-3 (1 of 2) The Trade Balance and the Real Exchange Rate



The trade balance is an increasing function of the real exchange rate, EP^*/P. When there is a real depreciation (a rise in q), foreign goods become more expensive relative to home goods, and we expect the trade balance to increase as exports rise and imports fall (a rise in TB) This is a movement *along* this line.

The Trade Balance

FIGURE 7-3 (2 of 2) The Trade Balance and the Real Exchange Rate (continued)



The trade balance may also depend on income. If home income rises, then some of the increase in income may be spent on the consumption of imports. For example, if home income rises from Y_1 to Y_2, then the trade balance will decrease, whatever the level of the real exchange rate, and the trade balance function will shift down.

Supply and Demand

Given our assumption that the current account equals the trade balance, gross national income Y equals GDP:

$$\text{Supply} = GDP = Y$$

Aggregate demand, or just "demand," consists of all the possible sources of demand for this supply of output.

$$\text{Demand} = D = C + I + G + TB$$

Substituting, we have

$$D = C\left(Y - \overline{T}\right) + \underset{(i)}{I} + \overline{G} + TB\left(E\overline{P}^{*}\mathrm{T}\,\overline{P}, Y - \overline{T}, Y^{*} - \overline{T}^{*}\right)$$

The goods market equilibrium condition is

$$Y = \underbrace{C\left(Y - \overline{T}\right) + I(i) + \overline{G} + TB\left(E\overline{P}^{*}\mathrm{T}\,\overline{P}, Y - \overline{T}, Y^{*} - \overline{T}^{*}\right)} \qquad (7\text{-}1)$$

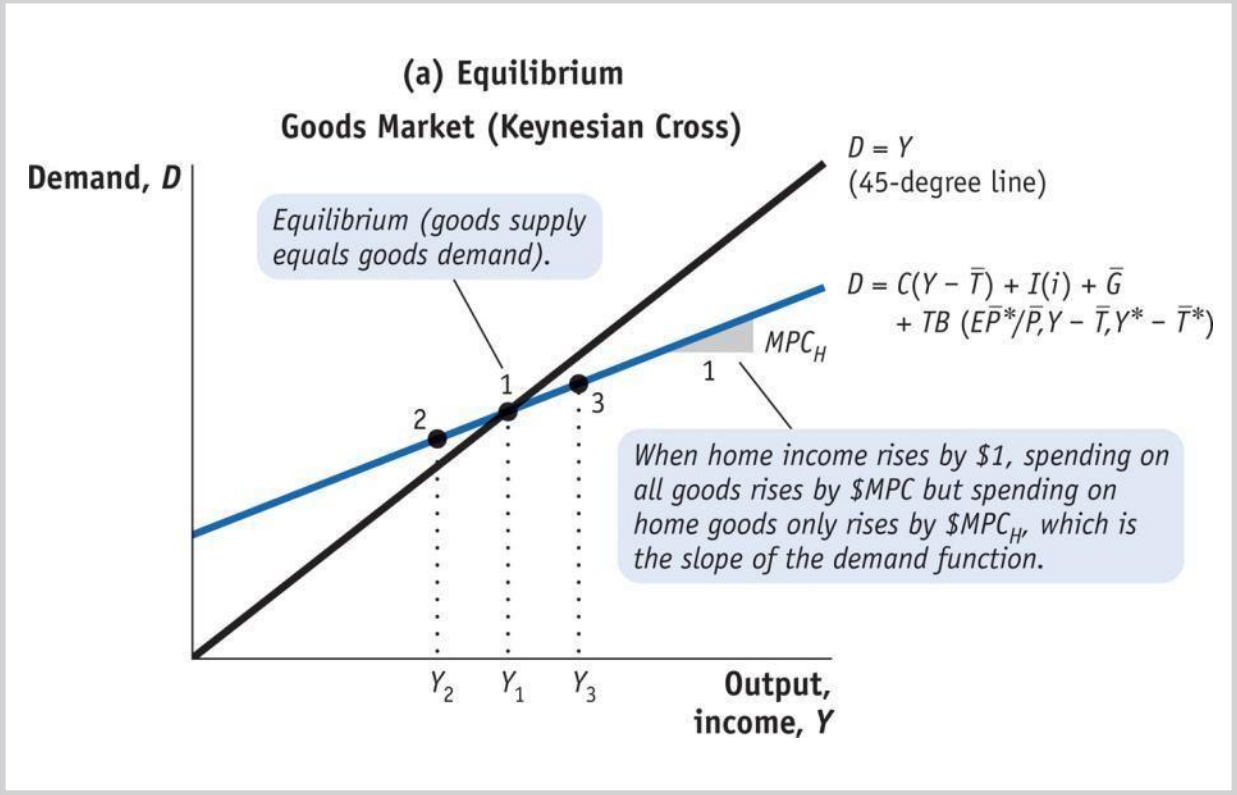
2 Goods Market Equilibrium: The Keynesian Cross

D

2 Goods Market Equilibrium: The Keynesian Cross

Determinants of Demand

FIGURE 7-7 (a) (1 of 2) The Goods Market Equilibrium and the Keynesian Cross

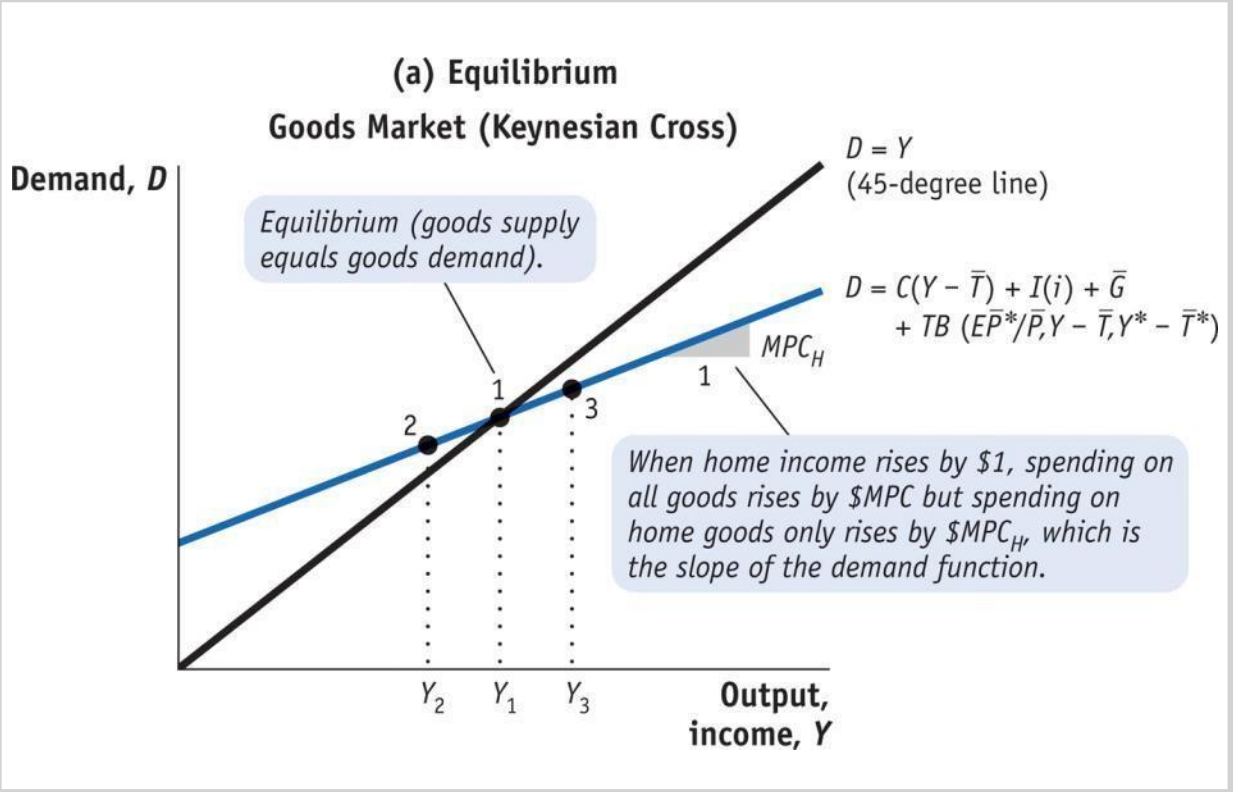


Equilibrium is where demand, D, equals real output or income, Y. In this diagram, equilibrium is at point 1, at an income or output level of Y_1. The goods market will adjust toward this equilibrium.

2 Goods Market Equilibrium: The Keynesian Cross

Determinants of Demand

FIGURE 7-7 (a) (2 of 2) The Goods Market Equilibrium and the Keynesian Cross (continued)



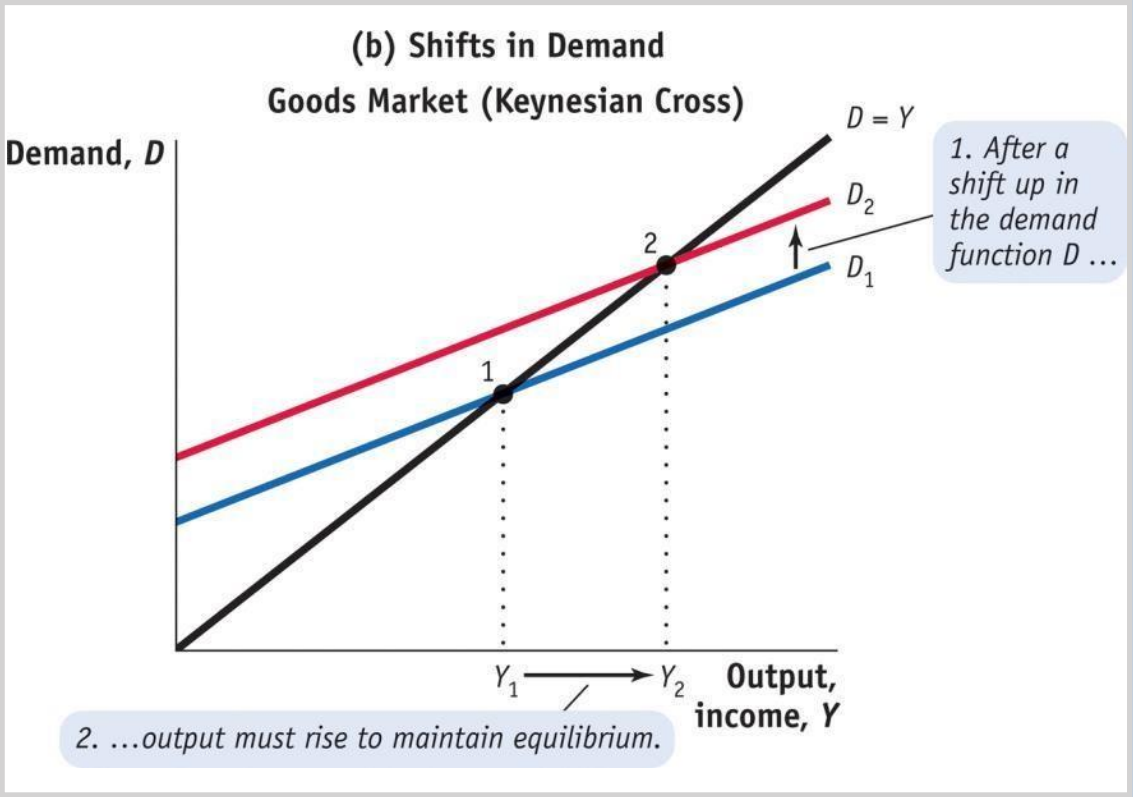
At point 2, the output level is Y_2 and demand, D, exceeds supply, Y; as inventories fall, firms expand production and output rises toward Y_1.

At point 3, the output level is Y_3 and supply Y exceeds demand; as inventories rise, firms cut production and output falls toward Y_1.

2 Goods Market Equilibrium: The Keynesian Cross

Determinants of Demand

FIGURE 7-7 (b) Shifts in Demand



The goods market is initially in equilibrium at point 1, at which point demand and supply both equal Y_1.

An increase in demand, D, at all levels of real output, Y, shifts the demand curve up from D_1 to D_2.

Equilibrium shifts to point 2, where demand and supply are higher and both equal Y_2. Such an increase in demand could result from changes in one or more of the components of demand: C, I, G, or TB.

2 Goods Market Equilibrium: The Keynesian Cross

Summary

Rise in government spending G
Fall in taxes T
Fall in the home interest rate i
Rise in the nominal exchange rate E
Rise in foreign prices P*
Fall in home prices P
Any shift up in the consumption function C
Any shift up in the investment function I
Any shift up in the trade balance function TB

$\Rightarrow$ Demand curve D shifts up

Increasing demand D at a given level of output Y

The opposite changes lead to a decrease in demand and shift the demand curve in.

Equilibrium in Two Markets

- A general equilibrium requires equilibrium in all markets—that is, equilibrium in the goods market, the money market, and the forex market.
- *The* **IS curve** *shows combinations of output Y and the interest rate i for which the goods and forex markets are in equilibrium.*

Forex Market Recap

Uncovered interest parity (UIP) Equation (10-3):

$$\underbrace{i}_{\text{Domestic intrest rate}} = \underbrace{i^{*}}_{\text{Foreign interest rate}} + \underbrace{\left(\frac{E^{e}}{E} - 1\right)}_{\text{Expected rate of depreciation of the domestic currency}}$$

$$\underbrace{\qquad\qquad\qquad\qquad}_{\text{Domestic return}}$$

3 Goods and Forex Market Equilibria: Deriving the IS Curve

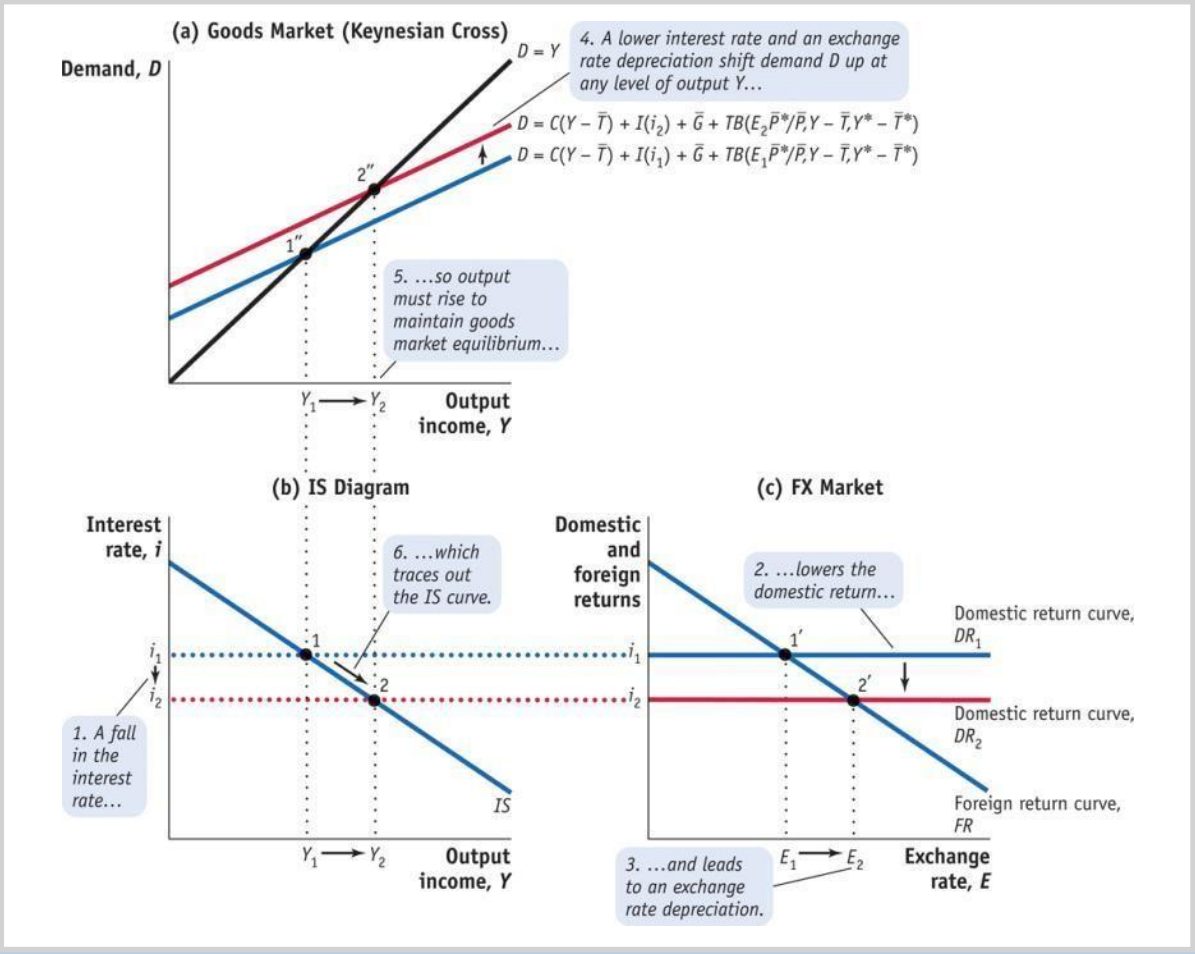
Expected foreign return

Domestic return

3 Goods and Forex Market Equilibria: Deriving the IS Curve

Equilibrium in Two Markets

FIGURE 7-8 (1 of 3) Deriving the IS Curve



The **Keynesian cross** is in panel (a), the IS curve is in panel (b), and the forex (FX) market is in panel (c).

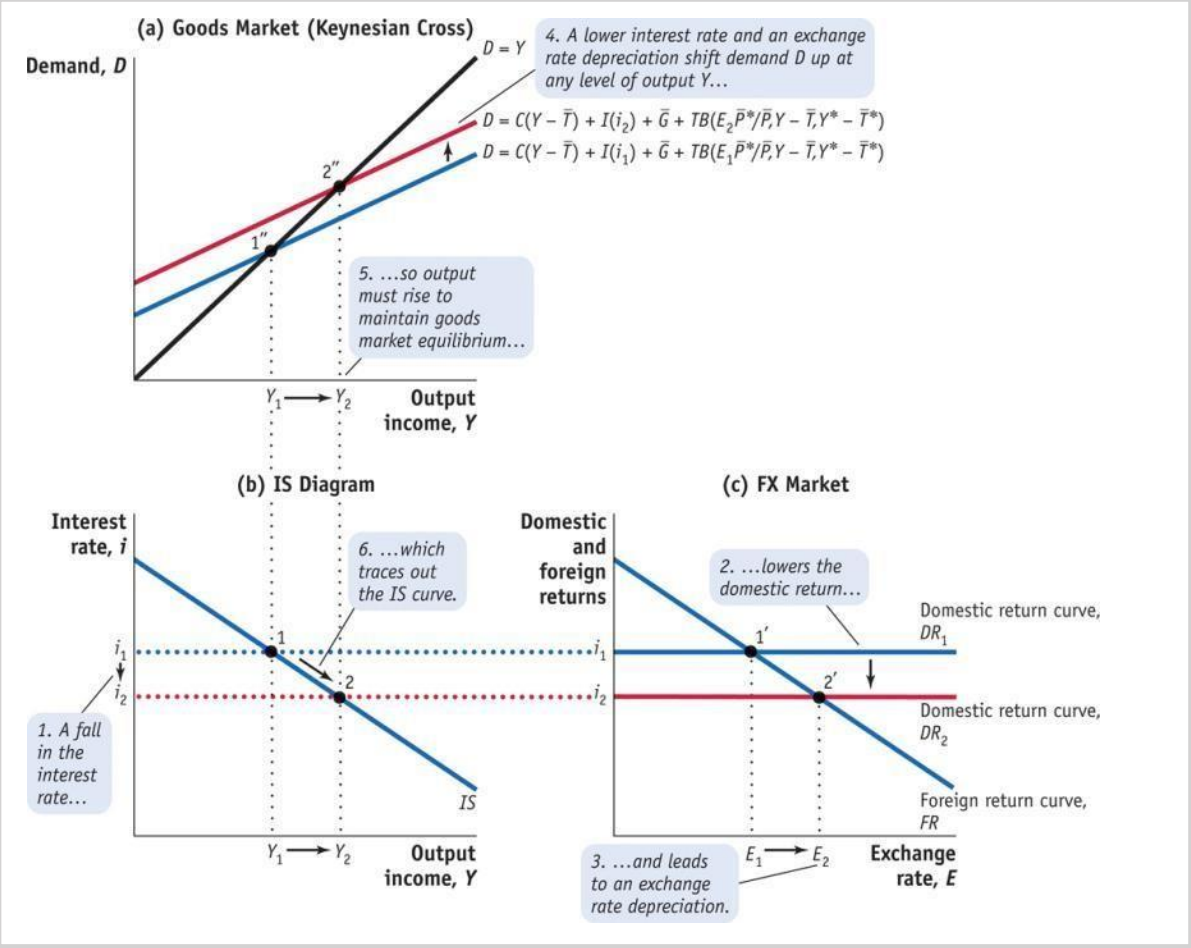
The economy starts in equilibrium with output, Y_1; interest rate, i_1; and exchange rate, E_1.

Consider the effect of a decrease in the interest rate from i_1 to i_2, all else equal. In panel (c), a lower interest rate causes a depreciation; equilibrium moves from 1′ to 2′.

3 Goods and Forex Market Equilibria: Deriving the IS Curve

Equilibrium in Two Markets

FIGURE 7-8 (2 of 3) Deriving the IS Curve (continued)

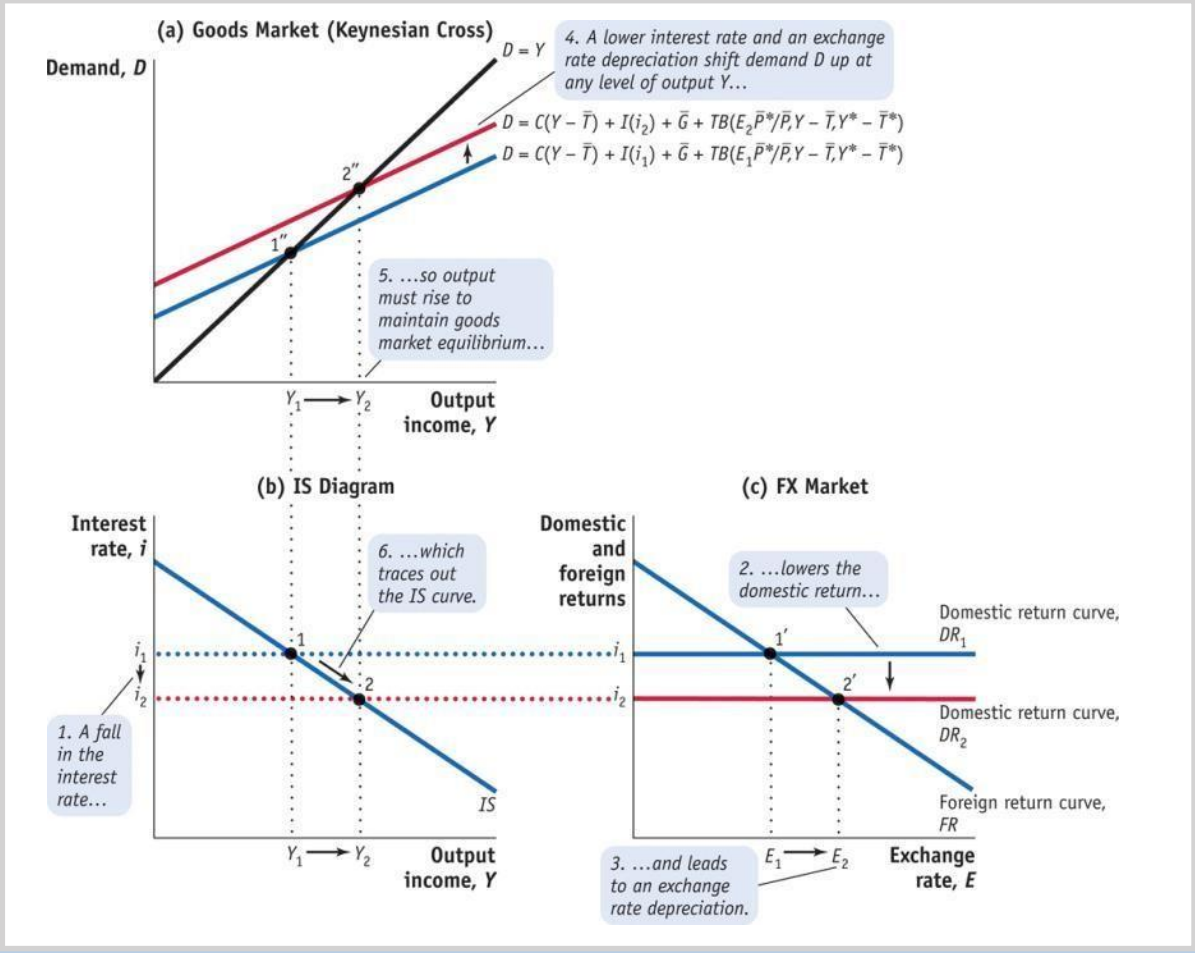


A lower interest rate boosts investment and a depreciation boosts the trade balance.

In panel (a), demand shifts up from D_1 to D_2, equilibrium from 1″ to 2″, and output from Y_1 to Y_2.

Equilibrium in Two Markets

FIGURE 7-8 (3 of 3) Deriving the IS Curve (continued)



In panel (b), we go from point 1 to point 2. The IS curve is thus traced out, a downward-sloping relationship between the interest rate and output.

When the interest rate falls from i_1 to i_2, output rises from Y_1 to Y_2.

The IS curve describes all combinations of i and Y consistent with goods and FX market equilibria in panels (a) and (c).

Deriving the IS Curve

Two important observations are in order:

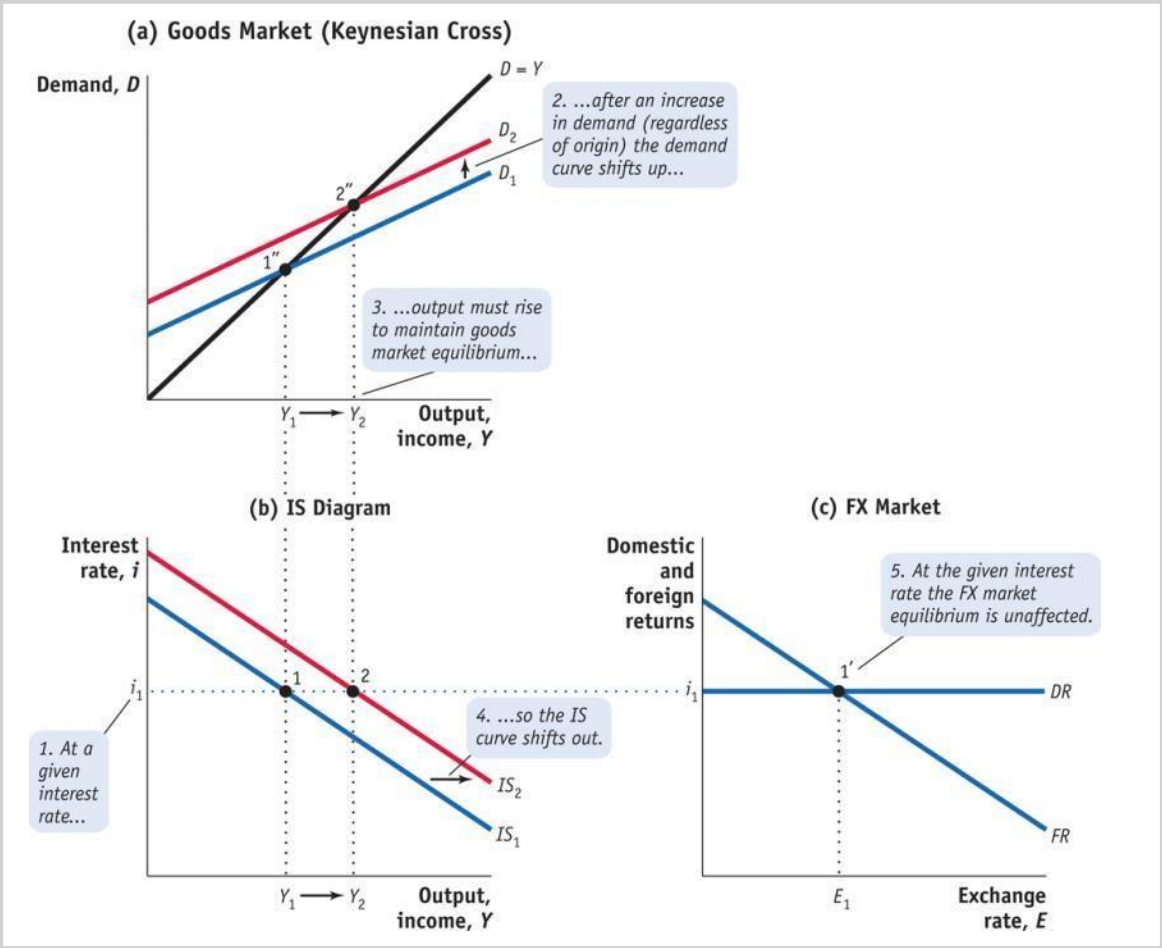
- In an open economy, lower interest rates stimulate demand through the traditional closed-economy investment channel and through the trade balance.
- The trade balance effect occurs because lower interest rates cause a nominal depreciation (a real depreciation in the short run), which stimulates external demand.

We have now derived the shape of the IS curve, which describes goods and forex market equilibrium:

- *The IS curve is downward-sloping. It illustrates the negative relationship between the interest rate i and output Y.*

Factors That Shift the IS Curve

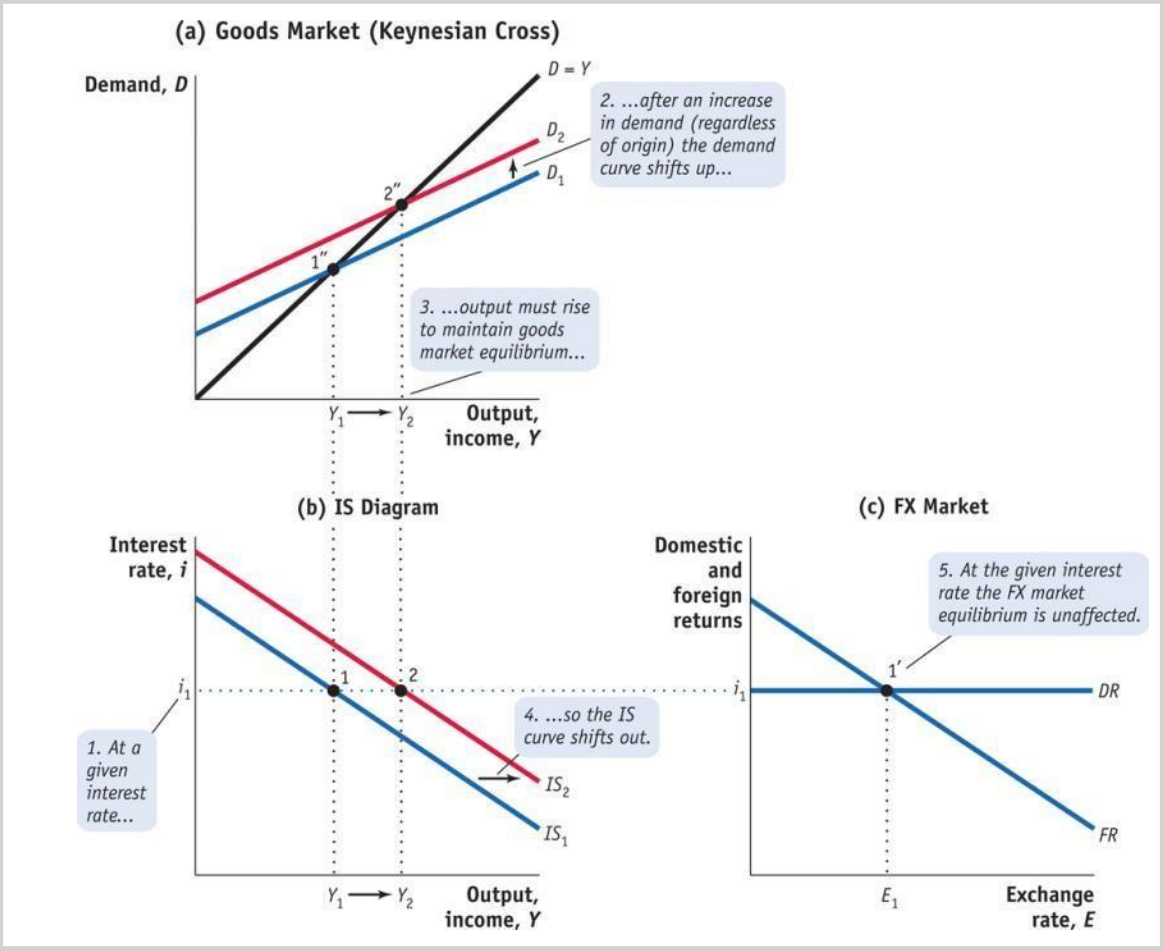
FIGURE 7-9 (1 of 2) Exogenous Shifts in Demand Cause the IS Curve to Shift



In the Keynesian cross in panel (a), when the interest rate is held constant at i_1, an exogenous increase in demand (due to other factors) causes the demand curve to shift up from D_1 to D_2 as shown, all else equal. This moves the equilibrium from 1″ to 2″, raising output from Y_1 to Y_2.

Factors That Shift the IS Curve

FIGURE 7-9 (2 of 2) Exogenous Shifts in Demand Cause the IS Curve to Shift (continued)



In the IS diagram in panel (b), output has risen, with no change in the interest rate.

The IS curve has therefore shifted right from IS_1 to IS_2.

The nominal interest rate and hence the exchange rate are unchanged in this example, as seen in panel (c).

Summing Up the IS Curve

$$IS = IS(G, T, i^*, E^e, P^*, P)$$

Factors That Shift the IS Curve

Rise in government spending G
Fall in taxes T
Rise in foreign interest rate i^*
Rise in future nominal exchange rate E^e
Rise in foreign prices P*
Fall in home prices P
Any shift up in the consumption function C
Any shift up in the investment function I
Any shift up in the trade balance function TB

$\Rightarrow$ Demand curve D shifts up (Increasing demand D at a given level of output Y and a given home interest rate i) $\Rightarrow$ IS curve shifts right (Increase in equilibrium output Y at a given home interest rate i)

These changes are for a given level of i.

The opposite changes lead to a decrease in demand and shift the

demand curve down and the IS curve to the left.

4 Money Market Equilibrium: Deriving the LM Curve

In this section, we derive a set of combinations of Y and i that ensures equilibrium in the money market, a concept that can be represented graphically as the **LM curve**.

Money Market Recap

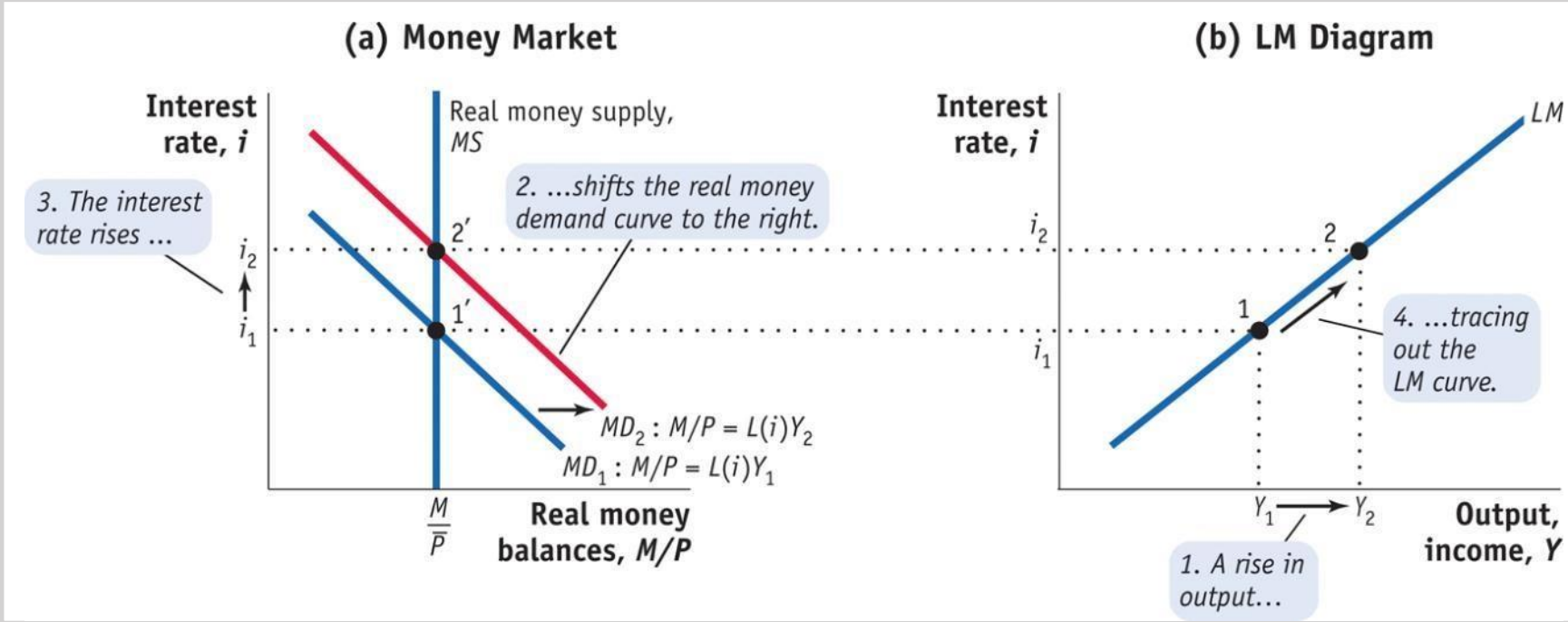
- In the short run, the price level is assumed to be sticky at a level $\bar{P}$, and the money market is in equilibrium when the demand for real money balances $L(i)Y$ equals the real money supply $M/\bar{P}$:

$$\underbrace{\frac{M}{\bar{P}}}_{\substack{\text{Real}\\ \text{money}\\ \text{supply}}} = \underbrace{L(i)\,Y}_{\substack{\text{Real}\\ \text{money}\\ \text{demand}}} \qquad (7\text{-}2)$$

4 Money Market Equilibrium: Deriving the LM Curve

Deriving the LM Curve

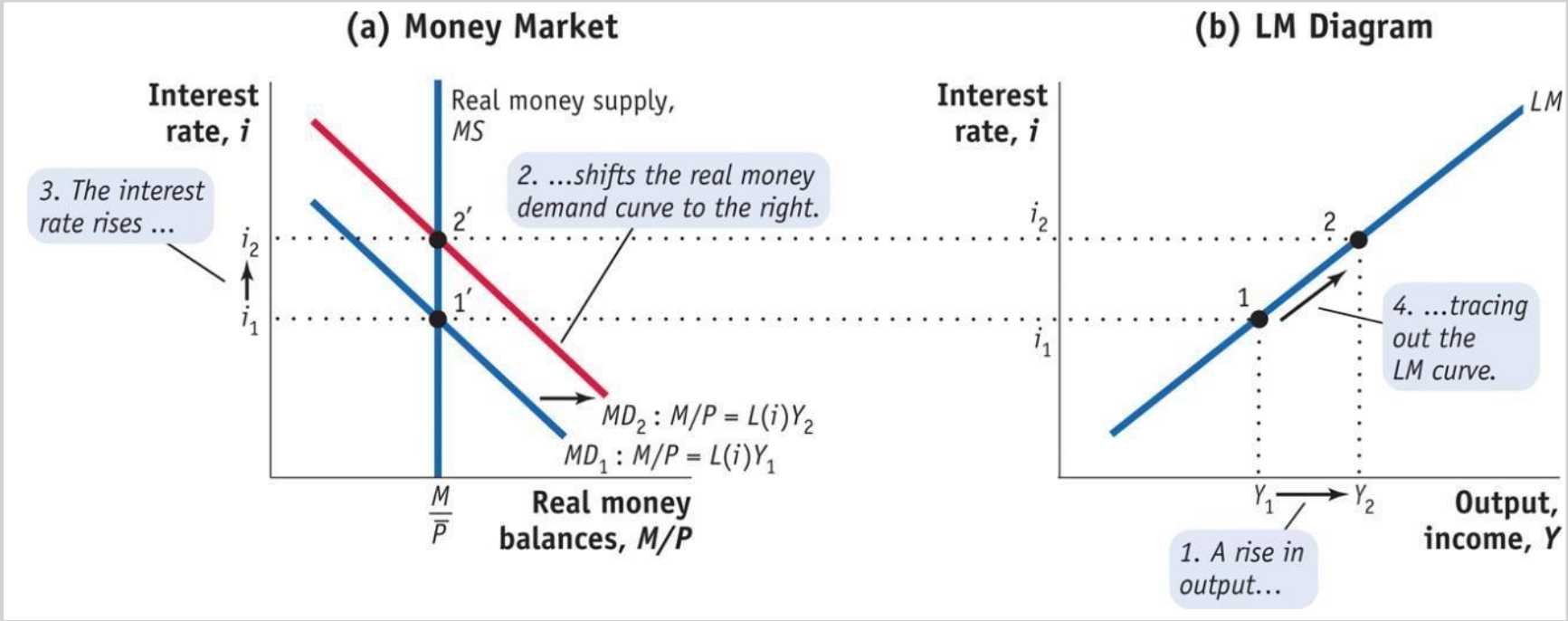
FIGURE 7-10 (1 of 2) Deriving the LM Curve



If there is an increase in real income or output from Y_1 to Y_2 in panel (b), the effect in the money market in panel (a) is to shift the demand for real money balances to the right, all else equal. If the real supply of money, MS, is held fixed at $M/\bar{P}$, then the interest rate rises from i_1 to i_2 and money market equilibrium moves from point 1′ to point 2′.

Deriving the LM Curve

FIGURE 7-10 (2 of 2) Deriving the LM Curve (continued)

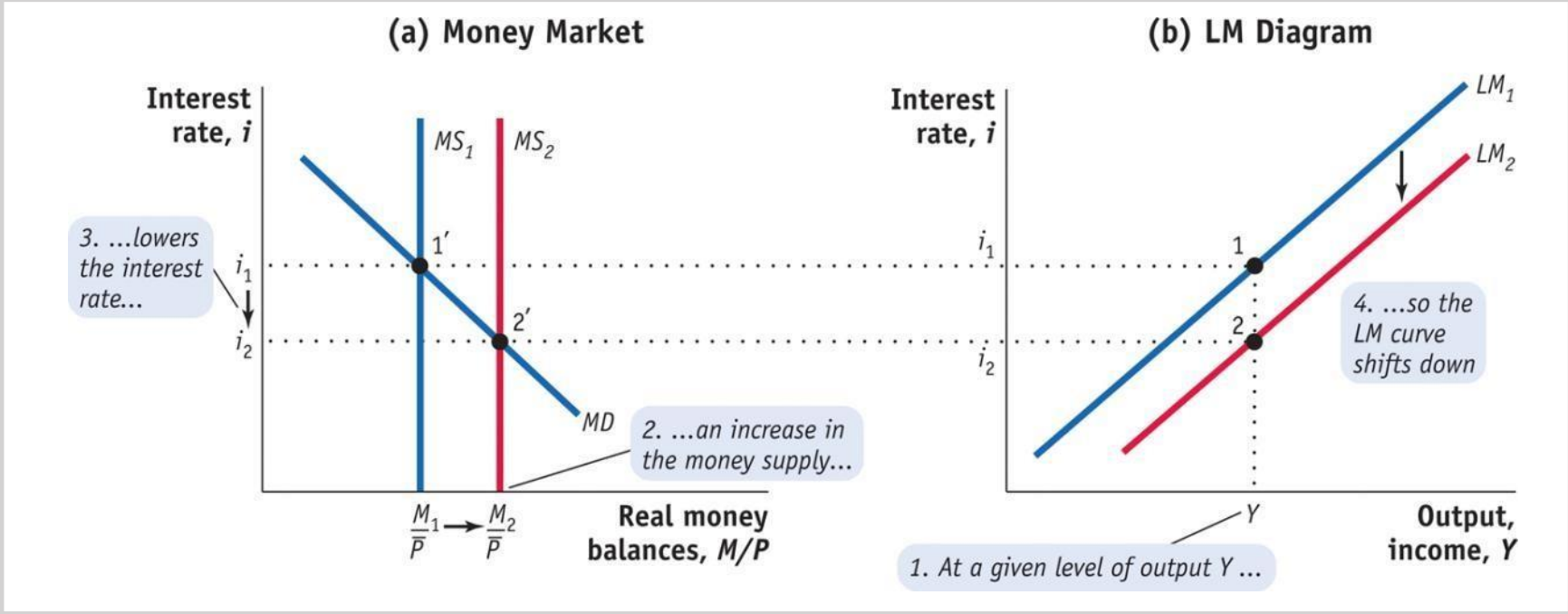


The relationship between the interest rate and income is known as the LM curve and is depicted in panel (b). The LM curve is upward-sloping: When the output level rises from Y_1 to Y_2, the interest rate rises from i_1 to i_2. The LM curve describes all combinations of i and Y that are consistent with money market equilibrium in panel (a).

4 Money Market Equilibrium: Deriving the LM Curve

Factors That Shift the LM Curve

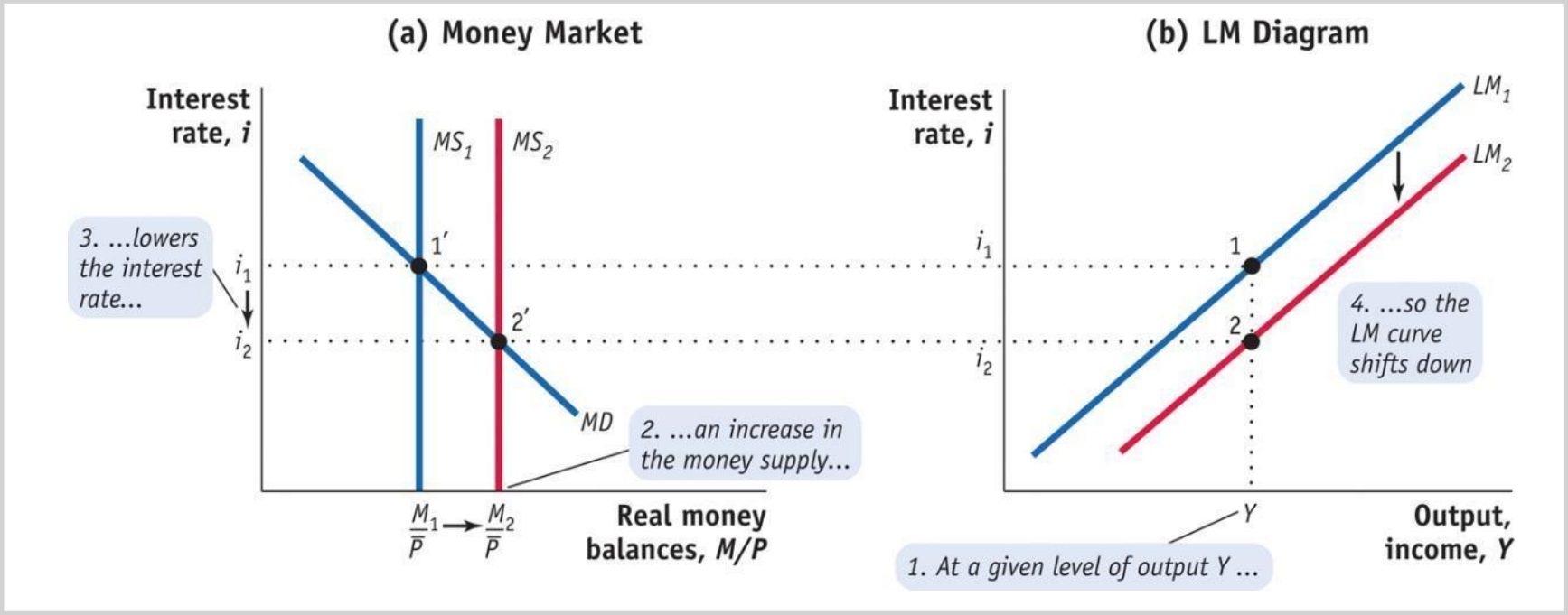
FIGURE 7-11 (1 of 2) Change in the Money Supply Shifts the LM Curve



In the money market, shown in panel (a), we hold fixed the level of real income or output, Y, and hence real money demand, MD. All else equal, we show the effect of an increase in money supply from M_1 to M_2. The real money supply curve moves out from MS_1 to MS_2. This moves the equilibrium from 1′ to 2′, lowering the interest rate from i_1 to i_2.

Factors That Shift the LM Curve

FIGURE 7-11 (2 of 2) Change in the Money Supply Shifts the LM Curve (continued)



In the LM diagram, shown in panel (b), the interest rate has fallen, with no change in the level of income or output, so the economy moves from point 1 to point 2.

The LM curve has therefore shifted down from LM_1 to LM_2.

4 Money Market Equilibrium: Deriving the LM Curve

Summing Up the LM Curve

$$LM = LM\left(M\mathrm{T}\overline{P}\right)$$

Factors That Shift the LM Curve

Rise in (nominal) money supply M

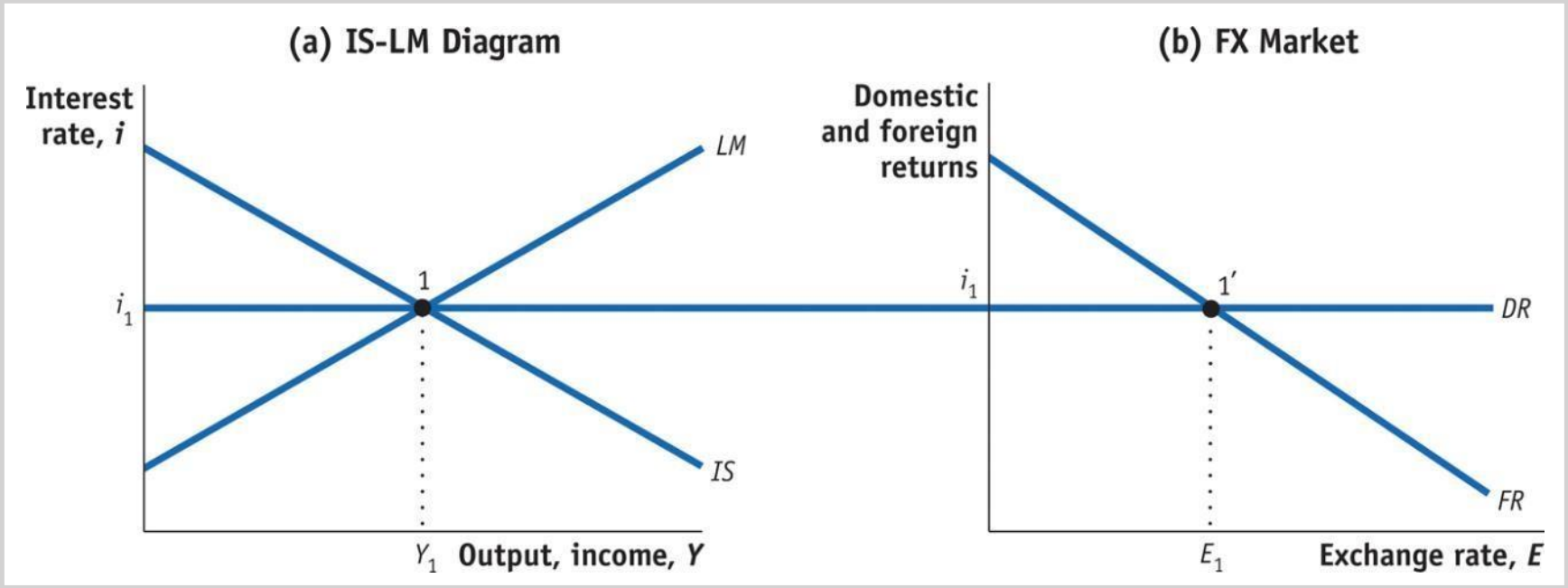
Any shift left in the money demand function L

$\Rightarrow$ LM curve shifts down or right

Decrease in equilibrium home interest rate i at given level of output Y

5 The Short-Run IS–LM–FX Model of an Open Economy

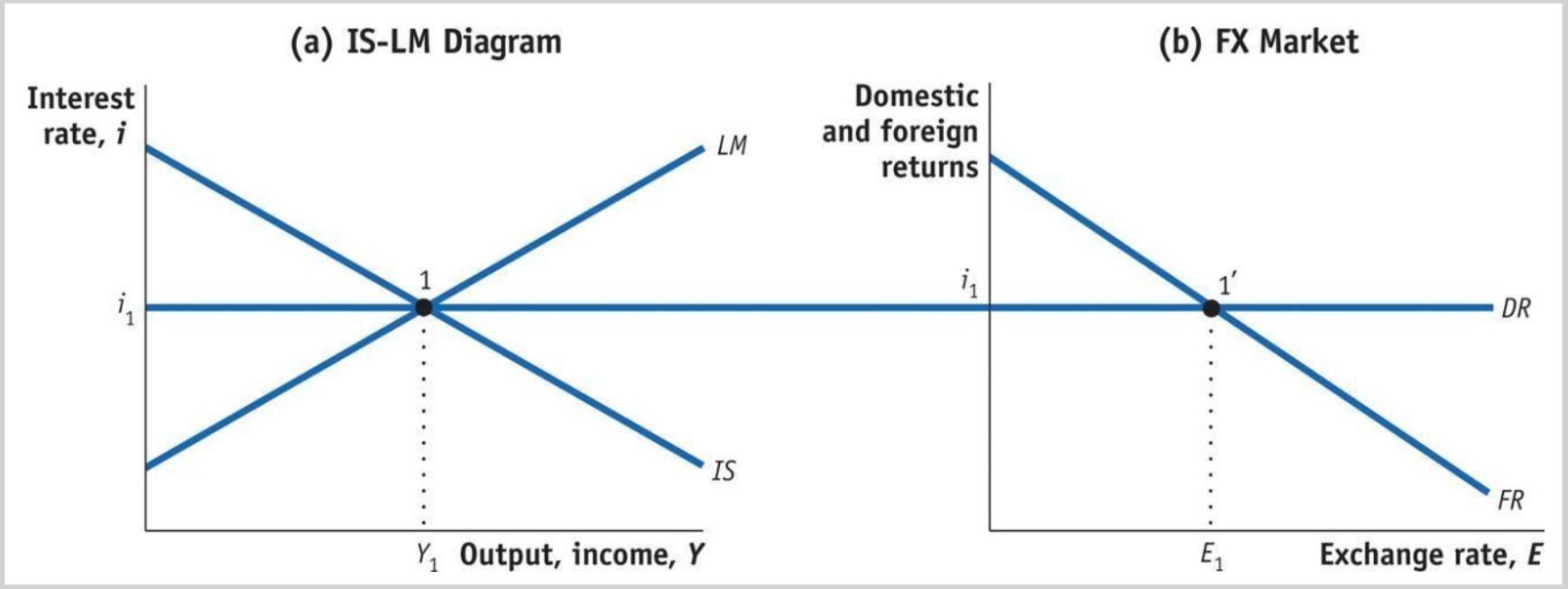
FIGURE 7-12 (1 of 2) Equilibrium in the IS–LM–FX Model



In panel (a), the IS and LM curves are both drawn. The goods and forex markets are in equilibrium when the economy is on the IS curve. The money market is in equilibrium when the economy is on the LM curve. Both markets are in equilibrium if and only if the economy is at point 1, the unique point of intersection of IS and LM.

5 The Short-Run IS–LM–FX Model of an Open Economy

FIGURE 7-12 (2 of 2) Equilibrium in the IS–LM–FX Model (continued)



In panel (b), the forex (FX) market is shown. The domestic return, *DR*, in the forex market equals the money market interest rate.

Equilibrium is at point 1′ where the foreign return *FR* equals domestic return, *i*.

CHAPTER 4

The Keynesian Short-Run Policy Model: Demand-Side Policies

Chapter Goals

- Discuss the key insight of the *AS*/*AD* model and list both its assumptions and its components.
- Describe the shape of the aggregate demand curve and what factors shift the curve.
- Explain the shape of the short-run and long-run aggregate supply curves and what factors shift the curves.
- Show the effects of shifts of the aggregate demand and aggregate supply curves on the price level and output in both the short run and long run.

- Discuss the limitations of the macro policy model.

The Keynesian *AS/AD* Model: Output

Short-run equilibrium output may differ from long-run potential output assuming a fixed price level.

- **Equilibrium output** is the level of output toward which the economy gravitates in the short run because of the cumulative cycles of declining or increasing production.
- **Potential output** is the highest amount of output an economy can sustainably produce using existing production processes and resources.

The Keynesian *AS/AD* Model: Policy

Keynesian model focuses on the use of monetary and fiscal policy.

- **Monetary policy** – a policy of influencing the economy through changes in the money supply and interest rates.
- **Fiscal policy** – the deliberate change in either government spending or taxes (or more generally the deficit) to stimulate or slow down the economy).

Key Insight of the Keynesian *AS/AD* Model

Paradox of thrift means an increase in saving may lead to a decrease in spending, output, causing a recession and lowering total saving.

Keynesians believe the economy would need government's help to prop up aggregate expenditures.

Keynesian economists advocated an activist demand management policy.

The Components of the *AS/AD* Model

Three important things about the *AS/AD* model:

1. It is a short-run model.
2. It is a pedagogical model.
3. It starts with aggregate relationships.

The *AS/AD* model does provide a simple model that suggest a role for government in keeping feedback effects from spiraling an economy downward.

The *AS/AD* Model Consists of Three Curves

1. Aggregate Demand (*AD*) Curve: a curve that shows how a change in the price level will change aggregate expenditures on all goods and services in an economy.

2. Short-Run Aggregate Supply (*SAS*) Curve: a curve that specifies how a shift in the aggregate demand curve affects the price level and real output in the short run, other things constant.

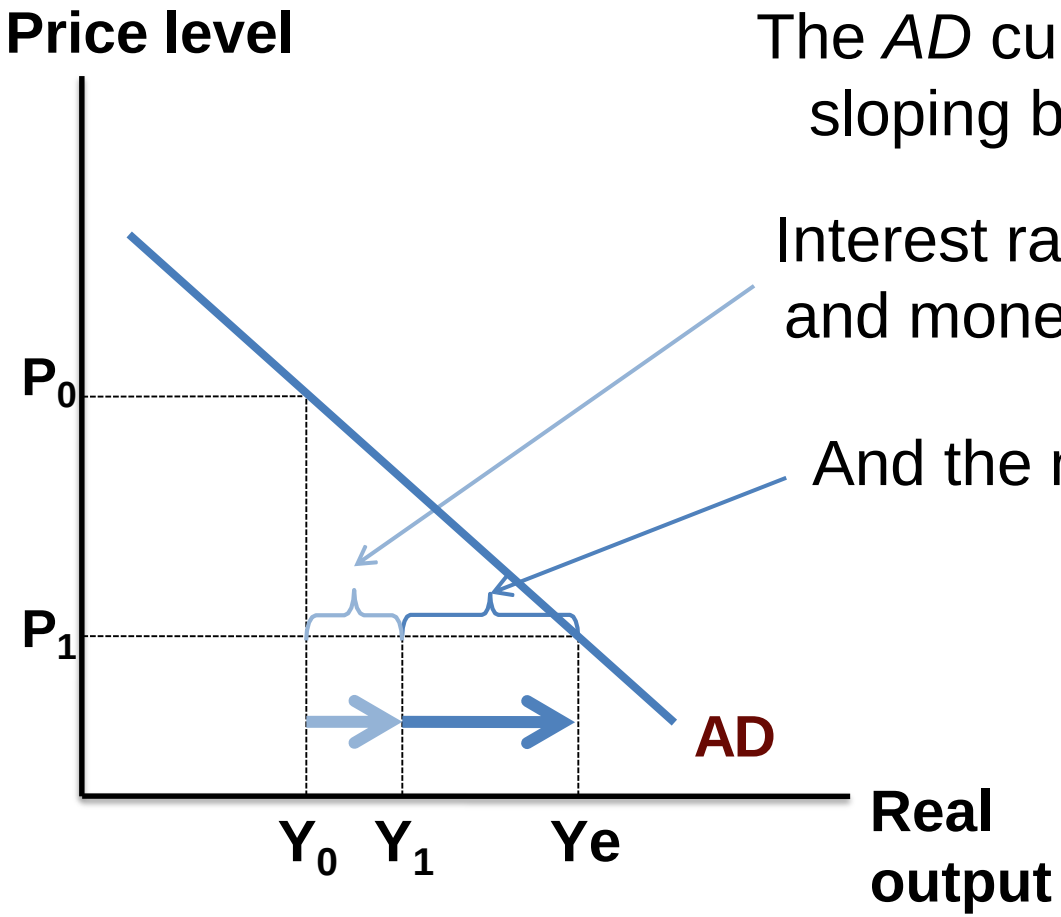
3. Long-Run Aggregate Supply (*LAS*) Curve: a curve that shows the long-run relationship between output and the price level.

The *AD* Curve Is Downward Sloping

Explanations that make the *AD* curve *downward* sloping:

- **Interest rate effect -** the effect that a lower price level has on investment expenditures through the effect that a change in the price level has on interest rates.
- **International effect -** as the price level falls (assuming the exchange rate does not change), net exports will rise.
- **Money wealth effect -** a fall in the price level will make the holders of money richer, so they buy more.
- **Multiplier effect -** the amplification of initial changes in expenditures.

The Slope of the *AD* Curve



The *AD* curve is *downward* sloping because of the:

Interest rate, international, and money wealth effects

And the multiplier effect

Dynamic Price-Level Adjustment

Feedback Effects

Dynamic effects exist that can overwhelm the standard *AD* shift factors.

Especially important when aggregate demand is decliningare:

- Expectations of falling aggregate demand
- Lower asset prices (declining nominal wealth)
- Financial panics

These forces counteract the standard shift factors.

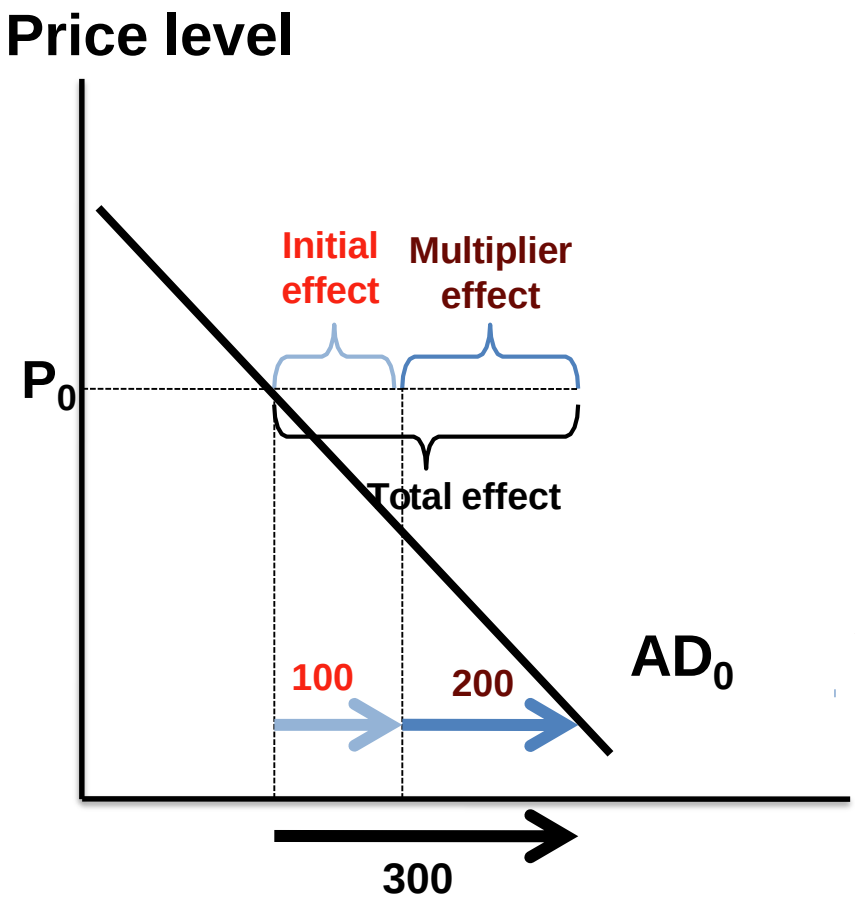
If strong enough, dynamic forces can cause aggregate demand to fall (shift to the left) when the price level falls.

Shifts in the *AD* Curve

A shift in the *AD* curve means that at every price level, total expenditures have changed. Five important shift factors are:

- Foreign income
- Exchange rate fluctuations
- Distribution of income
- Expectations
- Government policies

Shifts in the *AD* Curve



The AD curve shifts out by more than the initial change in expenditures:

- Exports increase by 100.
- The multiplier magnifies this shift.

AD curve shifts to the *right* by a multiple of 100, in this case by 300.

The Aggregate Supply Curves

The shape of the *SAS* curve reflects two different types of markets in our economy:

1. Auction markets: The markets represented by the supply/demand model. They are much more common in markets for resources such as oil or farm products.

2. Posted price markets: Also called **quantity-adjusting markets,** these are markets in which firms respond to changes in demand primarily by changing production instead of changing their prices. HOWEVER, firms tend to increase their markup when demand increases.

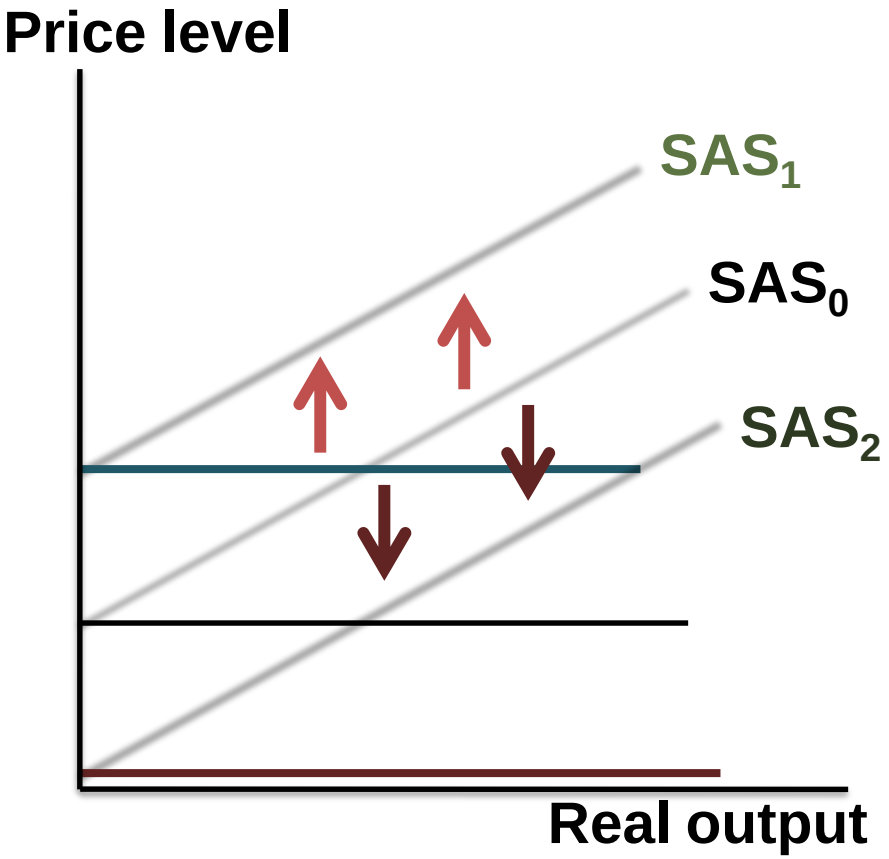
The Aggregate Supply Curves

The two reasons the *SAS* curve slopes upward are:

1. Upward-sloping supply curves in auction markets.

2. Firms' tendency to increase their markup when demand increases.

Shifts in the *SAS* Curve



Shifts in the *SAS* are caused by:

- Changes in Input prices
- Productivity
- Import prices
- Excise and sales taxes

When production costs increase, the *SAS* curve shifts up.

In general:

%Δ in price level =

%Δ in wages – %Δ in productivity

The Long-Run Aggregate Supply Curve

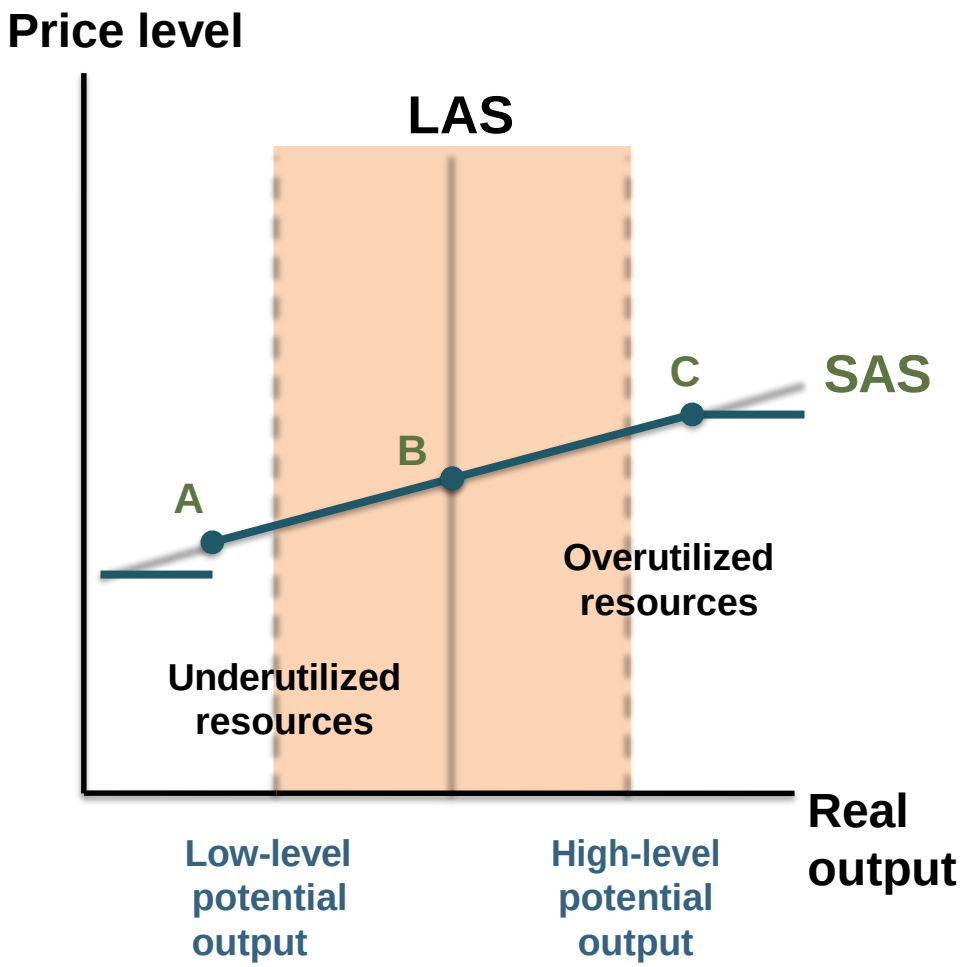
The long-run aggregate supply (*LAS*) curve shows the long-run relationship between output and the price level.

The position of the *LAS* curve depends on **potential output** which is the amount of goods and services an economy can produce when both capital and labor are employed at their maximum sustainable level.

The *LAS* curve is vertical because potential

output is unaffected by the price level.

The *LAS* Curve

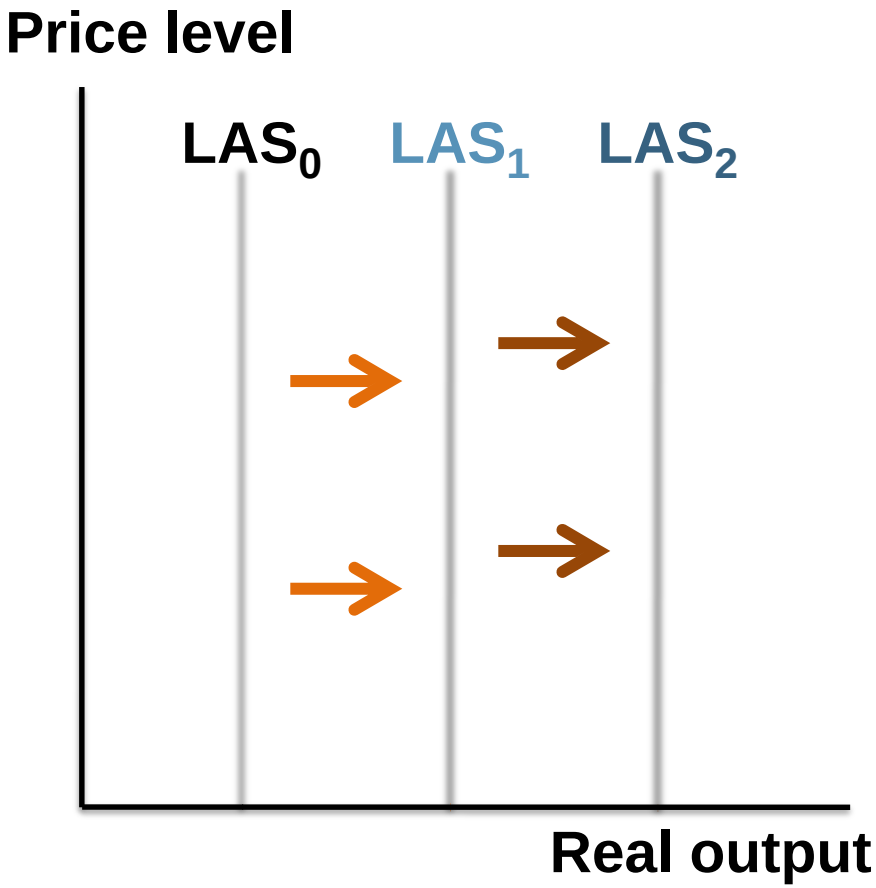


Potential output is assumed to be in the middle of a range bounded by high and low levels of potential output.

When resources are over-utilized (point C), factor prices may be bid up and the *SAS* shifts up.

When resources are under-utilized (point A), factor prices may decrease and *SAS* shifts down.

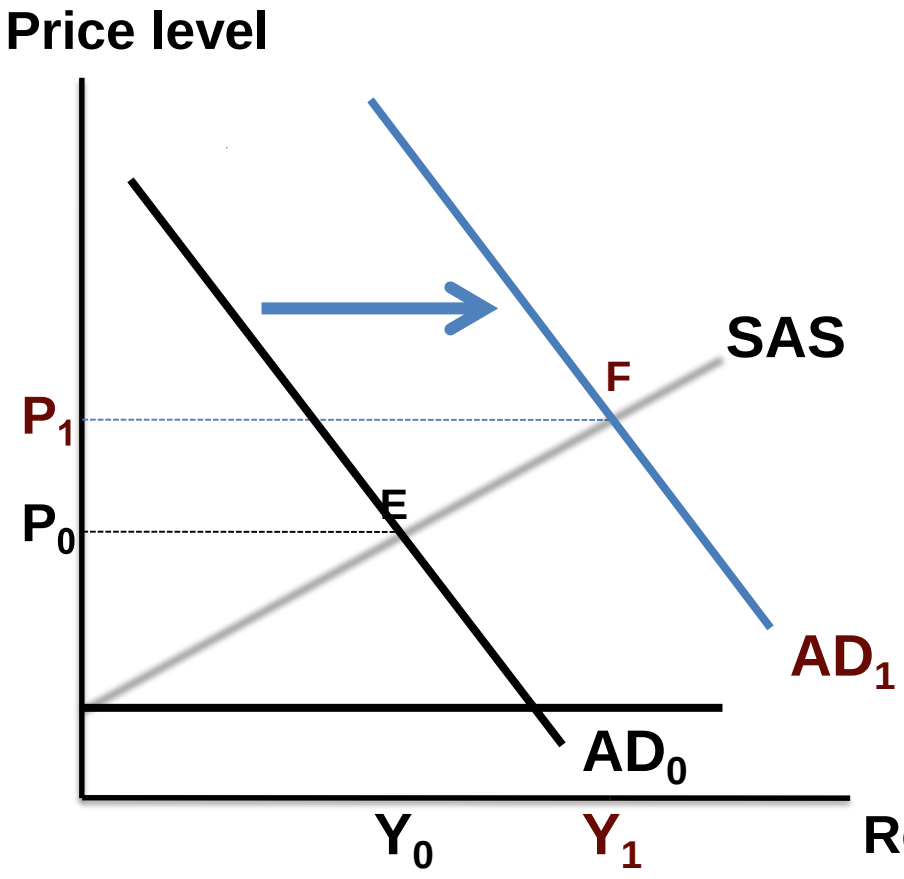
Shifts in the *LAS* Curve



Increases in the *LAS* are caused by increases in:

- Capital
- Available resources
- Growth-compatible institutions
- Technology
- Entrepreneurship

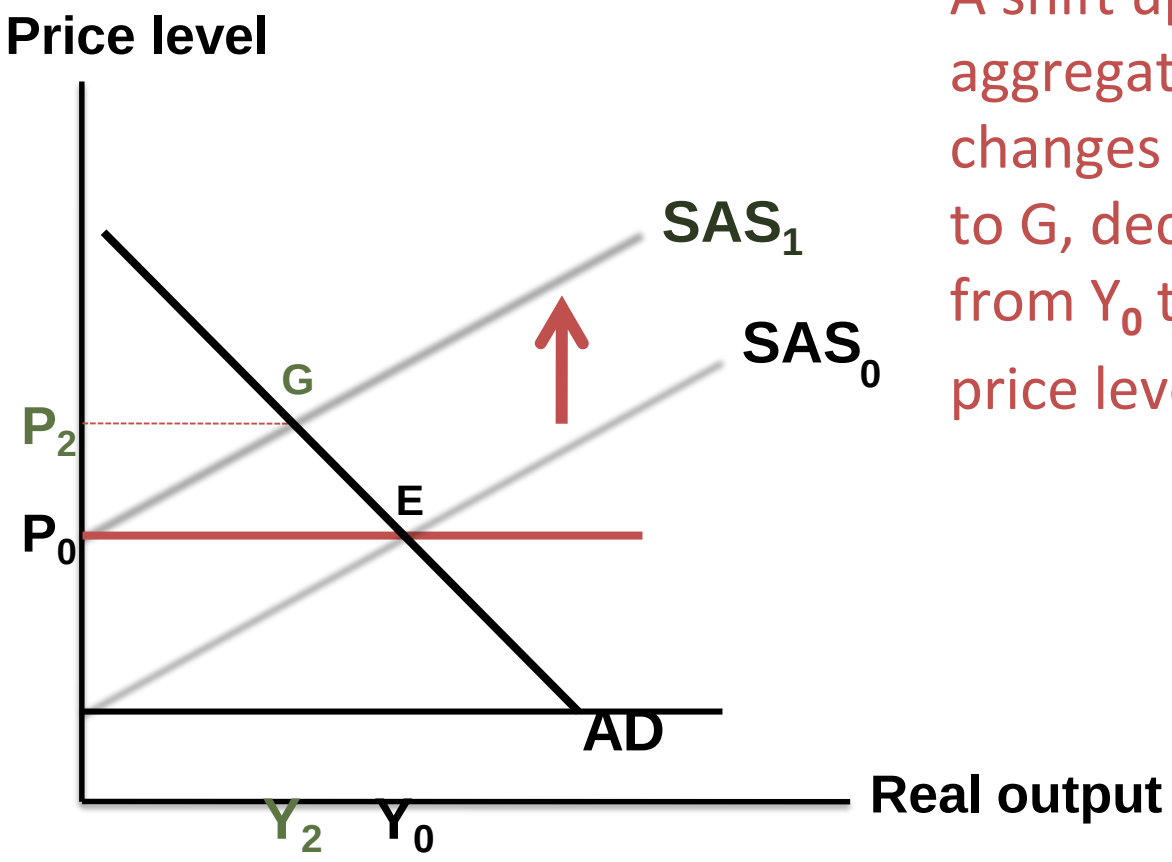
Short-Run Equilibrium in the *AD*/*AS* Model



Short-run equilibrium is where the *SAS* and *AD* curves intersect and point E is short-run equilibrium.

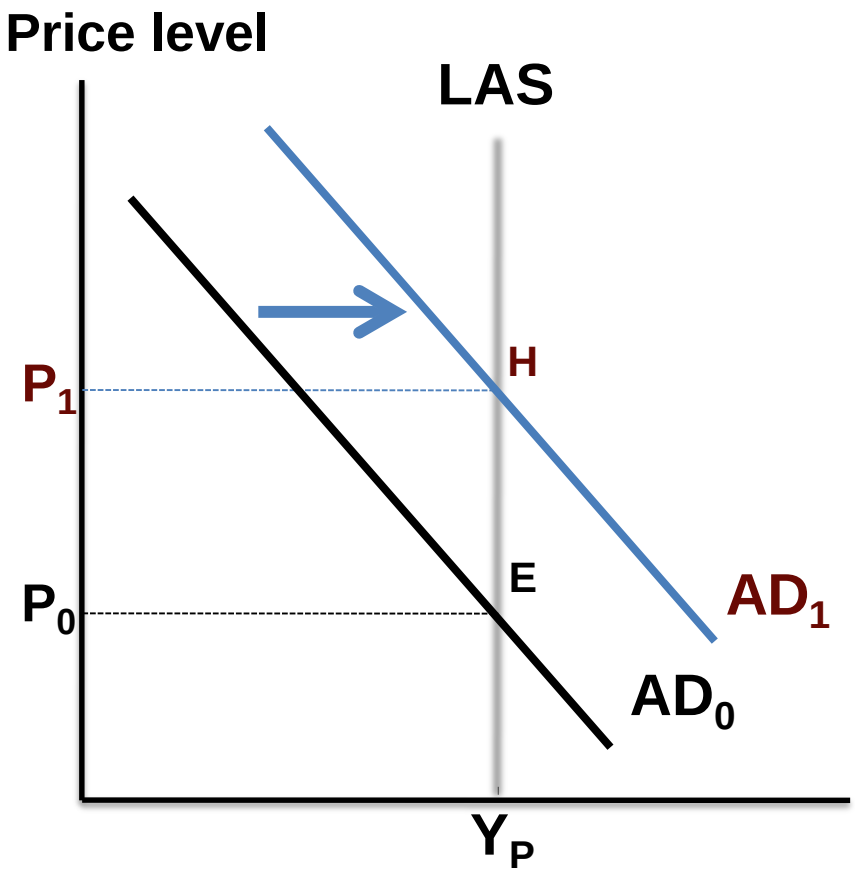
A shift in the aggregate demand curve to the right changes equilibrium from E to F, increasing output from Y_0 to Y_1 and increasing price level from P_0 to P_1.

Short-Run Equilibrium in the *AD*/*AS* Model



A shift up in the short-run aggregate supply curve changes equilibrium from E to G, decreasing output from Y_0 to Y_2 and increasing price level from P_0 to P_2.

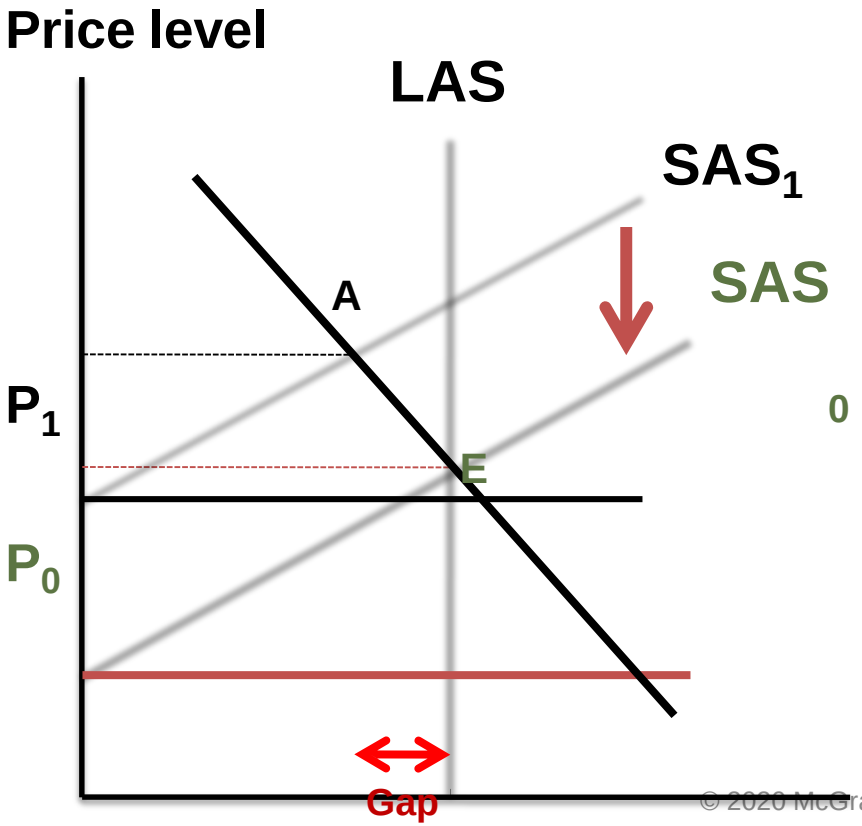
Long-Run Equilibrium in the *AD/AS* Model



Long-run equilibrium is where the LAS and AD curves intersect.

A shift in the aggregate demand curve changes equilibrium from E to H, increasing the price level from P_0 to P_1 but leaving output unchanged.

Application: A Recessionary Gapin the *AD/AS* Model



A **recessionary gap** is the amount by which equilibrium output is below potential output.

At point A, some resources are unemployed and the

recessionary gap is $Y_P - Y_1$.

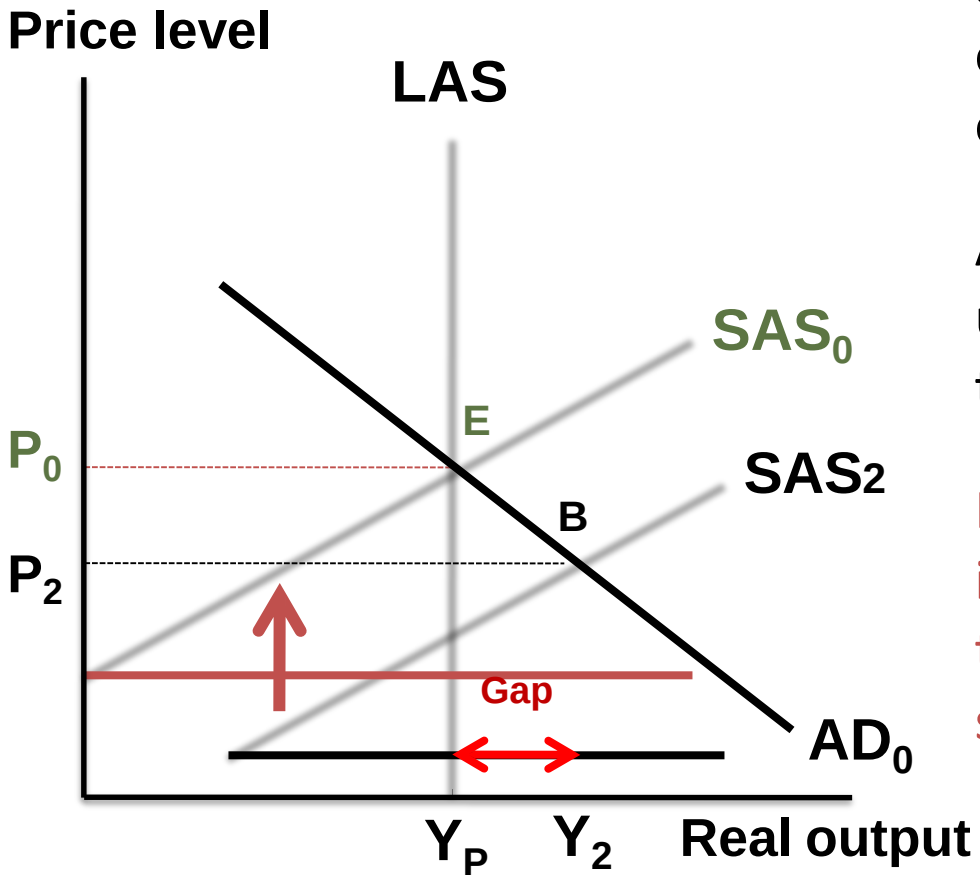
AD_0

Eventually wages and pricesdecrease and *SAS* shifts down to return the economy to a long and short-run equilibrium at E.

Y_1 Y_P

Real output

Application: An Inflationary Gap in the *AD/AS* Model



An **inflationary gap** is the amount by which equilibrium output is above potential output.

At point B, resources are being used beyond their potential and the inflationary gap is $Y_2 - Y_P$.

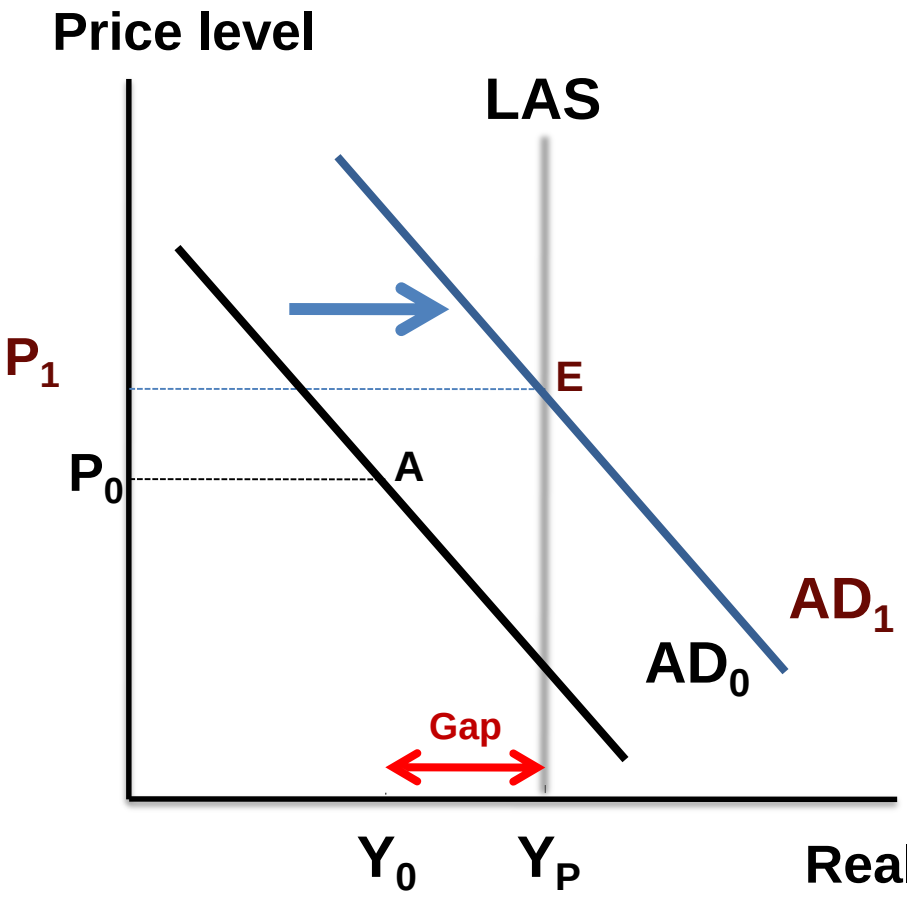
Eventually wages and prices increase and *SAS* shifts to return the economy to a long and short-run equilibrium at E.

Aggregate Demand Policy

A primary reason for government policy makers' interest in the AS/AD model is that monetary or fiscal policy shifts the AD curve.

- **Monetary policy** involves the Federal Reserve Bank changing the money supply and interest rates.
- **Fiscal policy** is the deliberate change in either government spending or taxes to stimulate or slow down the economy.

Application: Expansionary Fiscal Policy in the *AD*/*AS* Model

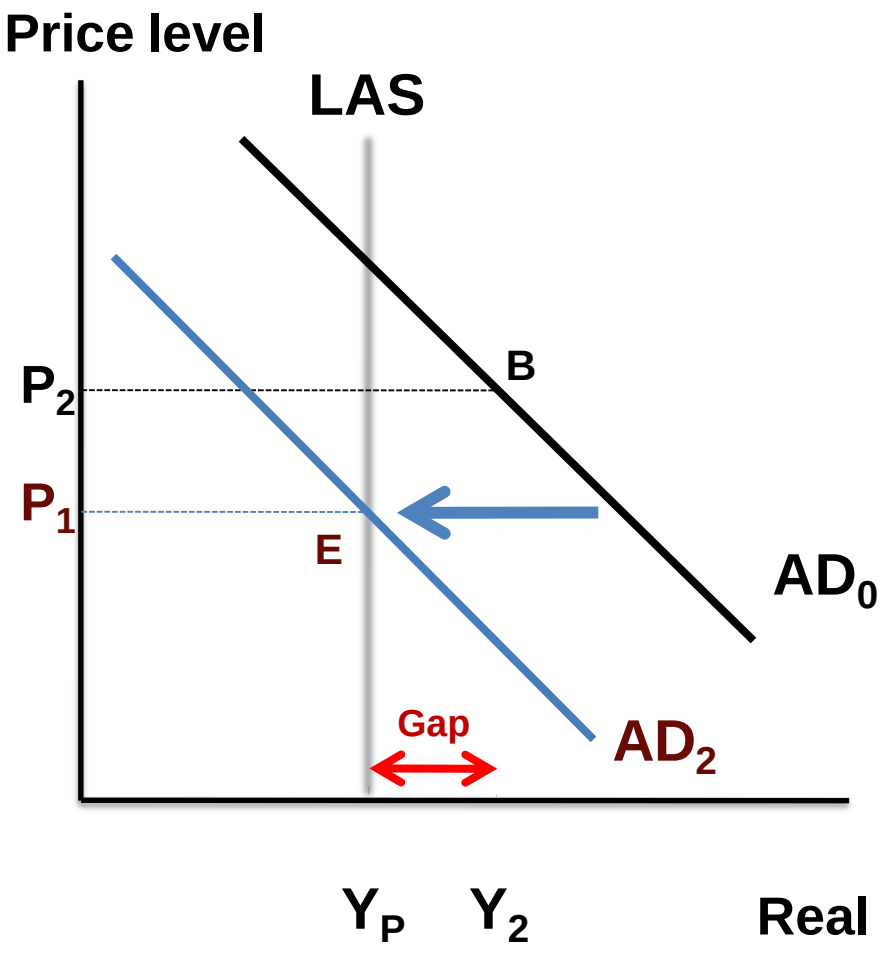


If the economy is at point A, there is a recessionary gap equal to $Y_P - Y_0$.

The appropriate fiscal policy is to increase government spending and/or decrease taxes.

AD shifts to the right and output returns to potential output Y_P and prices increase to P_1.

Application: Contractionary Fiscal Policy in the *AD*/*AS* Model



If the economy is point B, there is an inflationary gap $Y_2 - Y_P$.

The appropriate fiscal policy is to decrease government spending and/or increase taxes.

AD shifts to the left, output returns to potential output Y_P and inflation is prevented.

Limitations of the *AS*/*AD* Model

- The *AS*/*AD* model assumes away many possible feedback effects that can significantly affect the macroeconomy and lead to quite different conclusions.
- Implementing fiscal policy through changing taxes and government spending is a slow legislative process.
- There is no guarantee that government will do what economists say is necessary.

Limitations of the *AS*/*AD* Model

- Potential output (the level of output that the economy is capable of producing without generating inflation) is difficult to estimate.
- We do have ways to get a rough idea of where it is.
- There are many other possible interrelationships in the economy that the model does not take into account.
- The aggregate economy can become dynamically unstable, so a shock can set in motion changes that will not automatically be self-correcting.

Limitations of the *AS/AD* Model

There are two ways to think about the effectiveness offiscal policy: in the model and in reality.

The effectiveness of fiscal policy depends on the government's ability to perceive and to react appropriately to a problem.

Countercyclical fiscal policy is fiscal policy in which the government offsets any change in aggregate expenditures that would create a business cycle.

Fine-tuning is used to describe such fiscal policy designed to keep the economy always at its target orpotential level of income.

Chapter Summary (72 of

The key idea of the Keynesian *AS*/*AD* model is that in the short run the economy can deviate from potential output.

The *AS*/*AD* model consists of the aggregate demand curve, and the short-run aggregate supply curve, and the long-run aggregate supply curve.

The aggregate demand curve slopes downward because of the interest rate effect, the international effect, the money wealth effect, and the multiplier effect.

The short-run aggregate supply (*SAS*) curve is upward- sloping because, while for the most part firms in the United States adjust production to meet demand instead of changing price, some firms will raise prices when demand increases.

Chapter Summary (73 of

The long-run aggregate supply (*LAS*) curve is vertical atpotential output.

The *LAS* curve shifts out when available resources, capital, labor, technology, and/or growth-compatibleinstitutions increase.

Short-run equilibrium is where the *SAS* and *AD* curves intersect; Long-run equilibrium is where the *AD* and *LAS* curves intersect

Aggregate demand management policy attempts toinfluence the level of output in the economy

Chapter Summary (74 of

Fiscal policy works by providing a deliberate countershock to offset unexpected shocks to the economy.

Macroeconomic policy is difficult to conduct because:

- Implementing fiscal policy is a slow process.
- We don't really know where potential output is.
- There are interrelationships not included in the model.
- The economy can become dynamically unstable.

We must estimate potential output by looking at past levels of potential output and by looking at where the price level begins to rise.

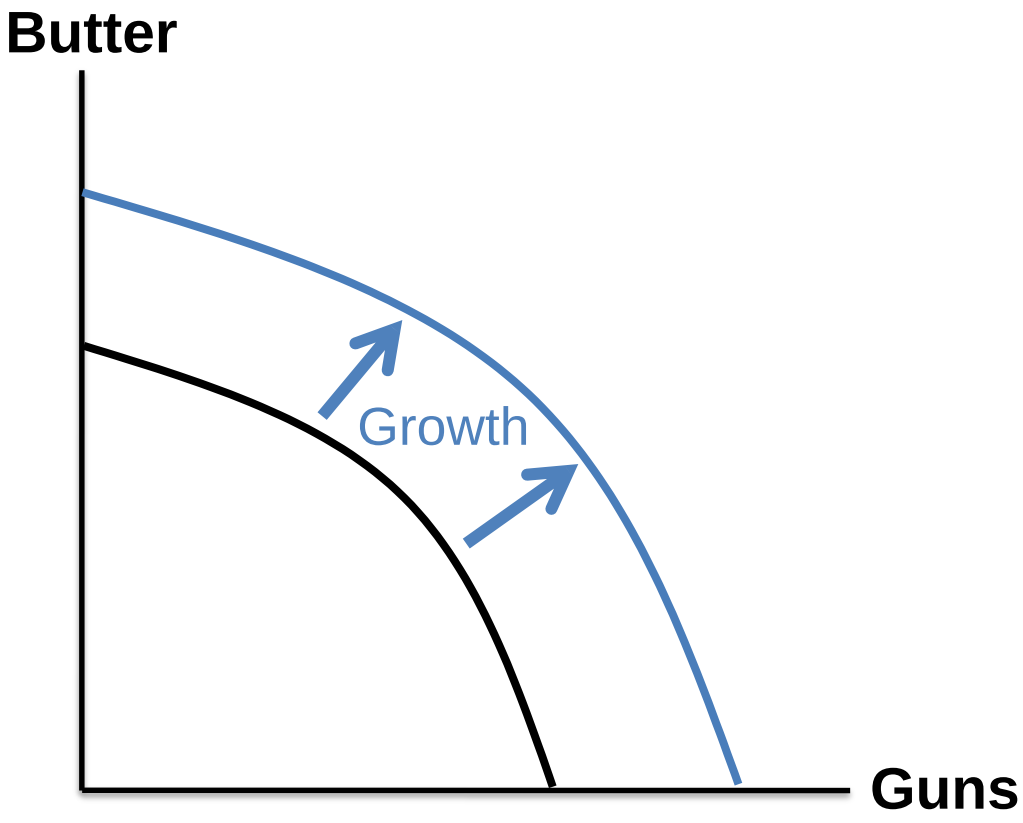
CHAPTER 5

The Classical Long-Run Policy Model: Growth and Supply-Side Policies

Chapter Goals

- Define growth, list its benefits and costs, and relate it to living standards.
- Discuss the relationship among markets, specialization, and growth.
- List five important sources of growth.
- Explain how the sources of growth can be turned into growth.

Production Possibility Curves



The analysis of growth focuses on forces that shift out the production possibility curve.

Growth and the Economy's Potential Output

Growth is an increase in potential output.

Potential output is the highest amount of output aneconomy can produce from existing production processes and resources.

- At potential output, an economy is operating on its production possibility curve.
- When below its potential output, an economy is operating inside its production possibility curve.
- Growth focuses on shifting out the production possibility curve.

Growth and the Economy's Potential Output

Productivity is output per unit of input.

The long-run growth focuses on supply; it assumes demand is sufficient to buy whatever is supplied.

Say's Law - supply creates its own demand.

The short-run focus is on how to get the economy operating at its potential.

The Benefits and Costs of Growth

Benefits of economic growth:

- Allows everyone in society, on average, to have more

Politically, growth (or predictions or growth) allows governments to avoid hard distributional questions.

Costs of economic growth:

- Pollution
- Resource exhaustion
- Destruction of natural habitat

Markets, Specialization, and Growth

Markets, specialization, and the division of labor increase productivity and growth.

- **Specialization** is the concentration of individuals on certain aspects of production.
- **Division of labor** is the splitting up of a task to allow for specialization of production.

Markets may seem unfair because of the effect that they have on the distribution of income.

Economic Growth, Distribution, and Markets

Even though growth isn't evenly distributed, it generally raises the incomes of the poor.

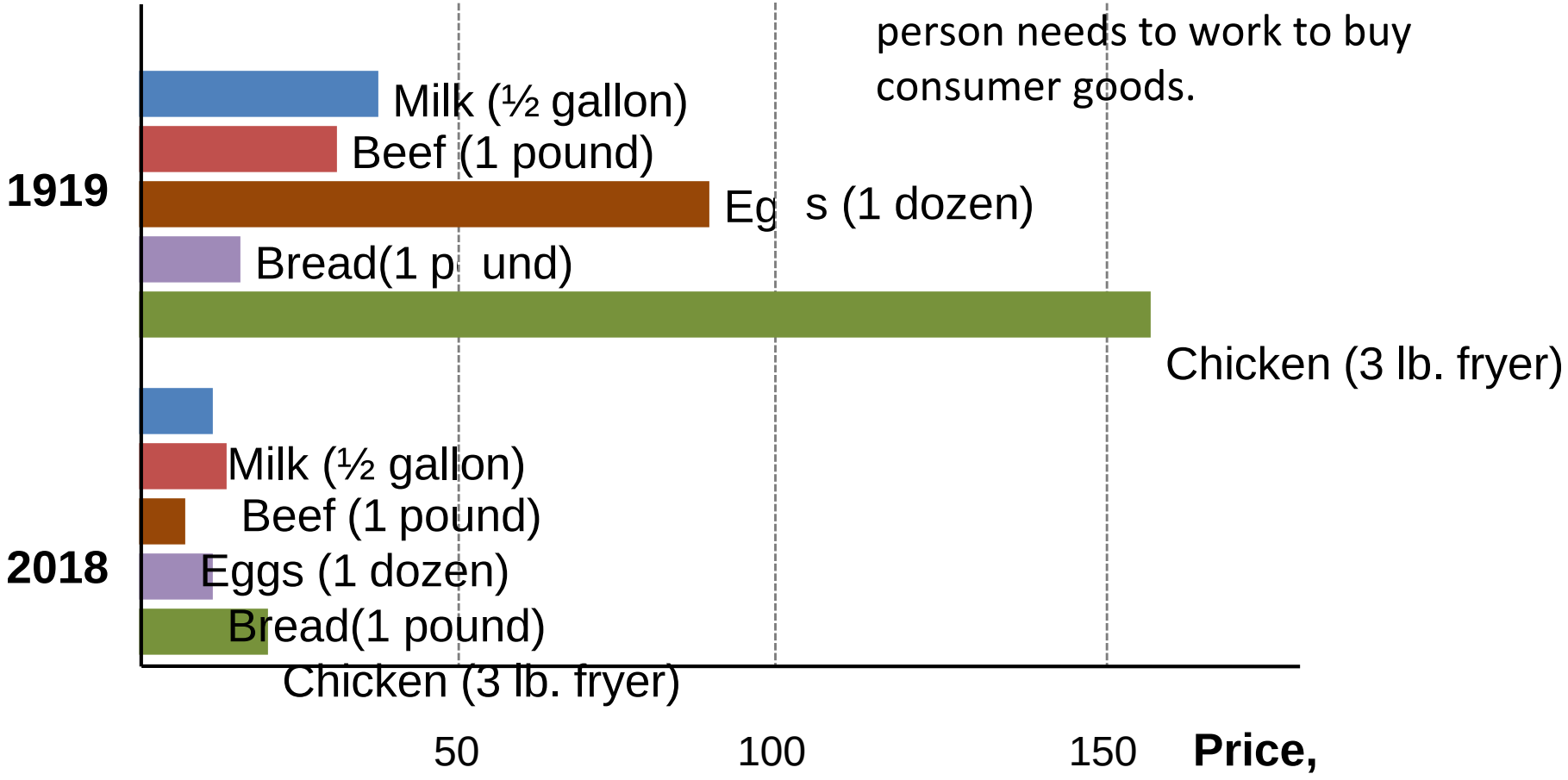
Today, the U.S. poverty level of a family of four is about $25,300.

If we go back 100 years ago in U.S. history, and adjust for inflation, that $25,300 income would put a family in the upper middle class.

Markets and growth had made that possible.

Cost of Goods in Hours of Work

Growth in the U.S. economy in the past century has reduced the number of hours the average person needs to work to buy consumer goods.



in minutes of work

Per Capita Growth

- Per capita output is total output divided by total population.
- **Per capita growth** means the country is producing more goods and services per person.

  Per capita growth = **%** change in output **–** **%** change in population

- Some suggest that median income is a better measure because it takes into account how income is distributed.

The Sources of Growth

Economists identify five important sources of growth:

1. Growth-compatible institutions
2. Investment and accumulated capital
3. Available resources
4. Technological development
5. Entrepreneurship

Growth-Compatible Institutions

- Markets and private ownership of property foster economic growth.
- When individuals get much of the gains of growth themselves, they work harder.
- Corporations are growth-compatible institutions because of limited liability, which gives stockholders an incentive to invest their savings in large enterprises.
- Informal property rights limit borrowing by the poor, and hence limit growth.

Investment and Accumulated Capital

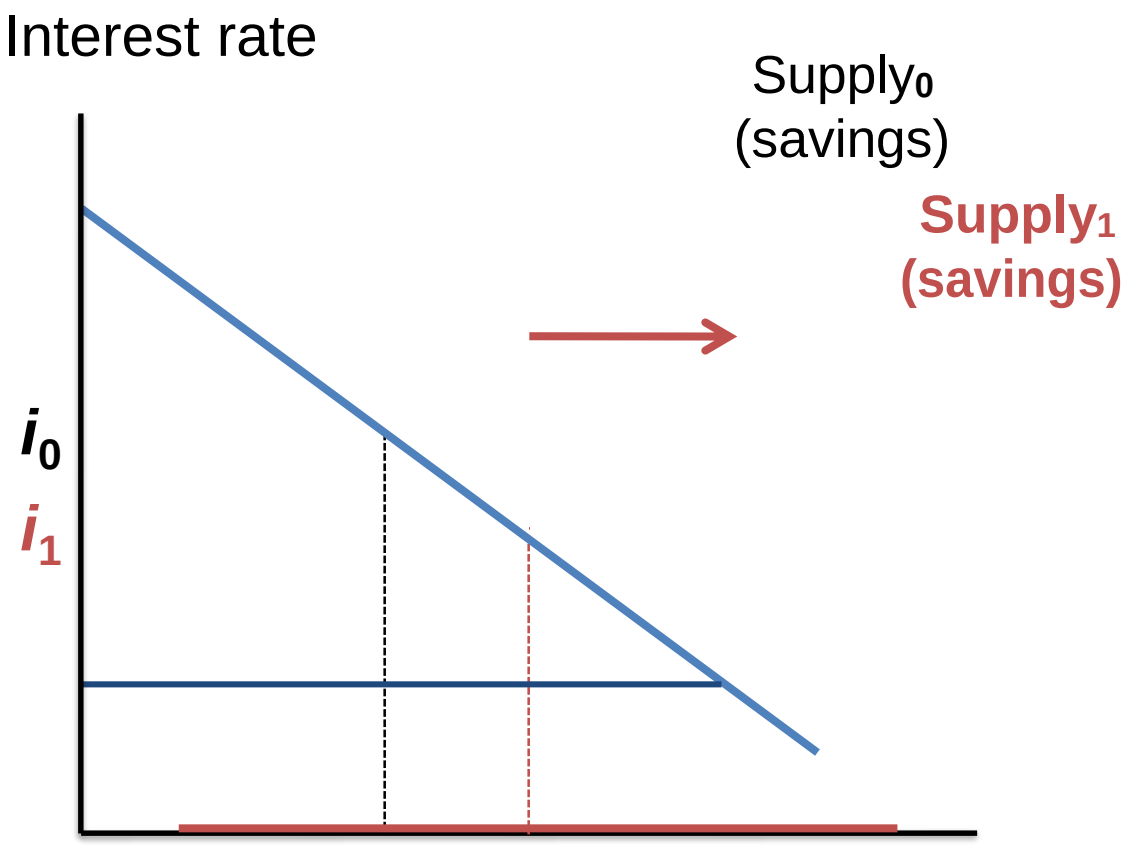
Although capital is a key element in growth, capital accumulation does not necessarily lead to growth.

Capital may become obsolete.

Capital is much more than physical machines andincludes:

- **Human capital** are skills that workers gain from experience, education, and on-the-job training
- **Social capital** is the habitual way of doing things that guides people in how they approach production

The Loanable Funds Market



When the supply of loanable funds (savings) increases, the interest rate falls and the quantity of loanable funds demanded (investment) increases.

Demand (investment)

loanable funds

Q of

Available Resources

The growth in the U.S. in the 20th century was due in part to its large supply of natural resources.

What is a resource depends on the production processes of an economy and technology.

Greater participation in the market is another means by which to increase available resources.

Available Resources

New technology can overcome a lack of resources.

New options being explored:

- Geothermal energy
- Algae-produced fuel
- Wind power
- Plug-in cars
- Fuel cells
- Sugarcane-based ethanol
- Nuclear

Technological Development

Technology is the way we make goods and supplyservices.

- Changes in technology and changes in the goods and services we buy fuel growth.
- Advances in technology shift the production possibility curve *outward* by making workers more productive.
- Important developments in biotechnology, computers, and communications have helped fuel

U.S. growth.

Entrepreneurship

Entrepreneurship is the ability to get things done using creativity, vision, willingness to accept risk, and a talent for translating vision into reality.

Examples of American entrepreneurs include:

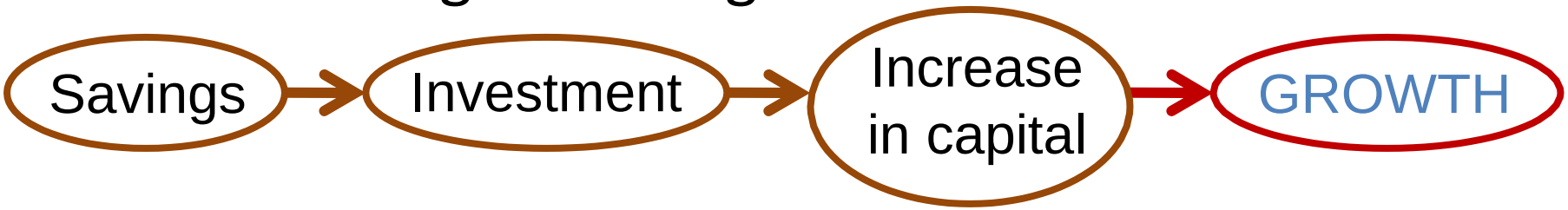
- Thomas Edison – generation and use of electricity
- Henry Ford – automobile production
- Bill Gates – computers and software
- Mark Zuckerberg – Facebook
- Jeff Bezos – Amazon

The Classical Growth Model

The Classical growth model is a theory of growth that focuses on the role of capital in the growth process.

According to the Classical growth model, the more capital an economy has, the faster it will grow.

Classical economists focused their analysis and their policy advice on how to increase investment because saving leads to growth.



The Law of Diminishing MarginalProductivity

Law of diminishing marginal productivity states that as more and more of a variable input is added to an existing fixed input, eventually the additional output produced with that additional input falls.

The predictions for the long term were incorrectbecause increases in technology and capital overwhelmed diminishing marginal productivity.

The focus changed to technology, not land or capital.

Without growth in technology, investment will not generate sustained growth. Eventually the per capitagrowth would stagnate.

Technology

Technological advance is the result of what the economy does.

- Invests in research and development
- Makes advances in pure science
- Works out new ways to organize production

The common knowledge aspect of technology createspositive externalities which is the key to growth.

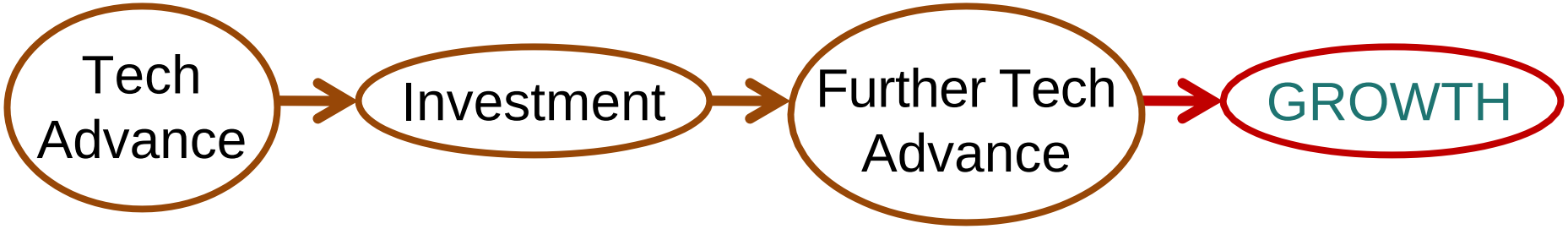
- **Positive externalities** are positive effects on others not taken into account by the decision maker.

New Growth Theory

New growth theory is a theory that emphasizes therole of technology in the growth process.

Technology is recognized as an important ingredient ingrowth.

Modern growth theory is named new growth theory.



Growth Policies

General policies that are good for growth include:

- Encouraging saving and investment
- Formalizing property rights and reducing bureaucracy and corruption
- Providing more of the right kind of education
- Promoting policies that encourage technological innovation
- Promoting policies that allow taking advantage of specialization

Chapter Summary (96 of

Growth is an increase in the amount of goods and services an economy can produce when both labor and capital are fully employed.

Growth increases potential output and shifts the production possibility curve out, allowing an economy to produce more goods.

Markets allow specialization and division of labor, which increases productivity and leads to growth.

Per capita growth means producing more goods and services per person. It can be calculated by subtracting the percentage change in the population from the percentage change in output.

Chapter Summary (97 of

Five sources of growth are (1) growth-compatible institutions (2) capital accumulation (3) available resources (4) technological development and (5) entrepreneurship.

The loanable funds market translates saving into investment that is necessary for growth and the interest rate equilibrates saving and investment.

The Classical growth model focuses on the role of capital accumulation in the growth process. The law of diminishing productivity limits growth of per capita income.

Chapter Summary (3 of 3)

New growth theory emphasizes the role of technology in the growth process.

Advances in technology have overwhelmed the effects of diminishing marginal productivity.

Policies that are good for growth are those that: (1) encourage saving and investment, (2) formalize property rights, (3) provide the right kind of education, (4) encourage technological innovation, and (5) take advantage of specialization.

CHAPTER 6

The Fiscal Policy Dilemma

Chapter Goals

- Summarize the Classical view of sound finance.
- Summarize the Keynesian view of functional finance.
- List six assumptions of the *AS/AD* model that lead to potential problems with the use of fiscal policy.
- Explain how automatic stabilizers work.

The Fiscal Policy Dilemma

The fiscal policy dilemma is what to do in periods of structural stagnation when both deficits and a balancedbudget are called for.

- When an economy falls into a structural stagnation, the effectiveness of expansionary demand-side policy is limited.
- International conditions, political considerations, and institutional issues make it impossible to achieve a sustainable growth rate consistent with the type of jobs and pay acceptable by most people.

Classical Economics and Sound Finance

Economists' view of public finance and fiscal policy before 1930's supported:

- **Sound finance,** a view of fiscal policy that the government budget should always be balanced except in wartime
  - This view was based on a combination of political and economic grounds, but primarily on political grounds

Ricardian Equivalence Theorem:Deficits Don't Matter

Classical economists also believed the argument for balanced budgets were weak. David Ricardo's theory is called the Ricardian equivalence theorem.

Ricardian equivalence theorem: Deficits do not affect the level of output because people increase savings to pay future taxes to repay the deficit.

Most economists felt that, in practice, deficits could

affect output and that it mattered a lot.

The Sound-Finance Precept

Given the collapse of economic expectations in the 1930s, many economists of the time favored giving up the principle of sound finance, at least temporarily, and using government spending to stimulate the economy.

If the economy is in a small recession, do nothing.

If the economy is in a depression, use deficit spending.

Keynesian Economics andFunctional Finance

In 1940's, economists view of public finance and fiscal policy changed with J.M Keynes' *The General Theory* and followed with Abba Lerner's *The Economics of Control.*

Functional finance held that governments should make spending and taxing decisions on the basis of their effect on the economy, not on the basis of some moralistic principle that budgets should be balanced.

If spending was too low, government should run a deficit; if spending was too high, government should run a surplus.

Functional finance nicely fits the *AS*/*AD* model.

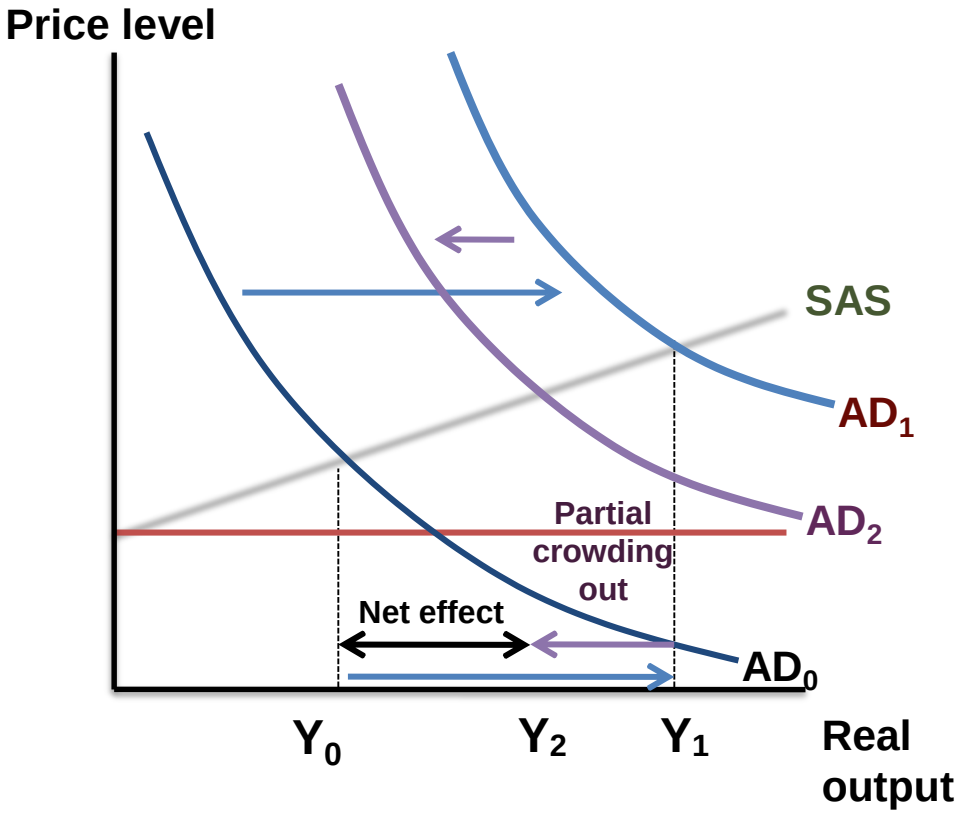
Assumptions of the *AS/AD* Model

Six assumptions of the *AS/AD* model that could lead toproblems with fiscal policy are:

1. Financing the deficit doesn't have any offsetting effects.
2. Government knows what the situation is.
3. Government knows the economy's potential income level.
4. Government has flexibility in changing spending and taxes.
5. The size of the government debt doesn't matter.
6. Fiscal policy doesn't negatively affect other goals.

Crowding Out

Crowding out is the offsetting of a change in government expenditures by a change in private expenditures in the opposite direction.



The Government Knows the Situation

Data problems limit fiscal policy for fine tuning.

- Getting reliable numbers on the economy takes time.
- We may be in a recession and not know it.

The government relies on large macroeconomic models and leading indicators to predict where the economy will be like in the future, but the

forecasts are imprecise.

The Government Knows the Economy'sPotential Income Level

No one knows for sure the potential *full-employment* income.

Economists now see full employment to be closer to 4percent.

Differences in estimates of potential income often leadto different policy recommendations.

In most cases, the U.S. economy is in an ambiguousstate where some economists are calling for expansionary policy and others are calling for

contractionary policy.

The Government has Flexibility in ChangingTaxes and Spending

Putting fiscal policy into place takes time and has serious implementation problems.

Numerous political and institutional realities in the U.S. today make implementing fiscal policy difficult.

Disagreements between Congress and the President may delay implementing appropriate

fiscal policy for months, even years.

The Size of the Government DebtDoesn't Matter

Although there is no inherent reason why activist functional finance policies should have caused persistent deficits, increases in government debt have occurred for three reasons:

1. Early activists favored not only fiscal policy, but also large increases in government spending.

2. Politically it's easier for government to increase spending and decrease taxes than vice versa.

3. Most economists believe that a country's debt becomes a problem somewhere around 90 to

100 percent of a country’s GDP.

Fiscal Policy Doesn't Negatively AffectOther Government Goals

A society has many goals: achieving potential income is only one of those goals.

National economic goals may conflict.

For example, when the government runs expansionary fiscal policy, the trade deficit increases.

Building Fiscal Policies into Institutions

To avoid the problems of direct fiscal policy, economistshave attempted to build fiscal policy into U.S. institutions.

An **automatic stabilizer** is any government program orpolicy that will counteract the business cycle without any new government action.

Automatic stabilizers include:

- Welfare payments
- Unemployment insurance
- The income tax system

How Automatic Stabilizers Work

When the economy is in a recession, the unemployment rate rises.

Unemployment insurance is automatically paid to the unemployed, offsetting some of the fall in income.

Income tax revenues also decrease when income fallsin a recession, providing a stimulus to the economy.

Automatic stabilizers also work in reverse.

- When the economy expands, government spending for unemployment insurance decreases and taxes increase.

State Government Finance and Procyclical Fiscal Policy

State constitutional provisions mandating balanced budget act as automatic destabilizers.

- During recessions states cut spending and raise taxes.
- During expansions states increase spending and cut taxes.

Procyclical fiscal policy is changes in government spending and taxes that increase the cyclical

fluctuations in the economy instead of reducing them.

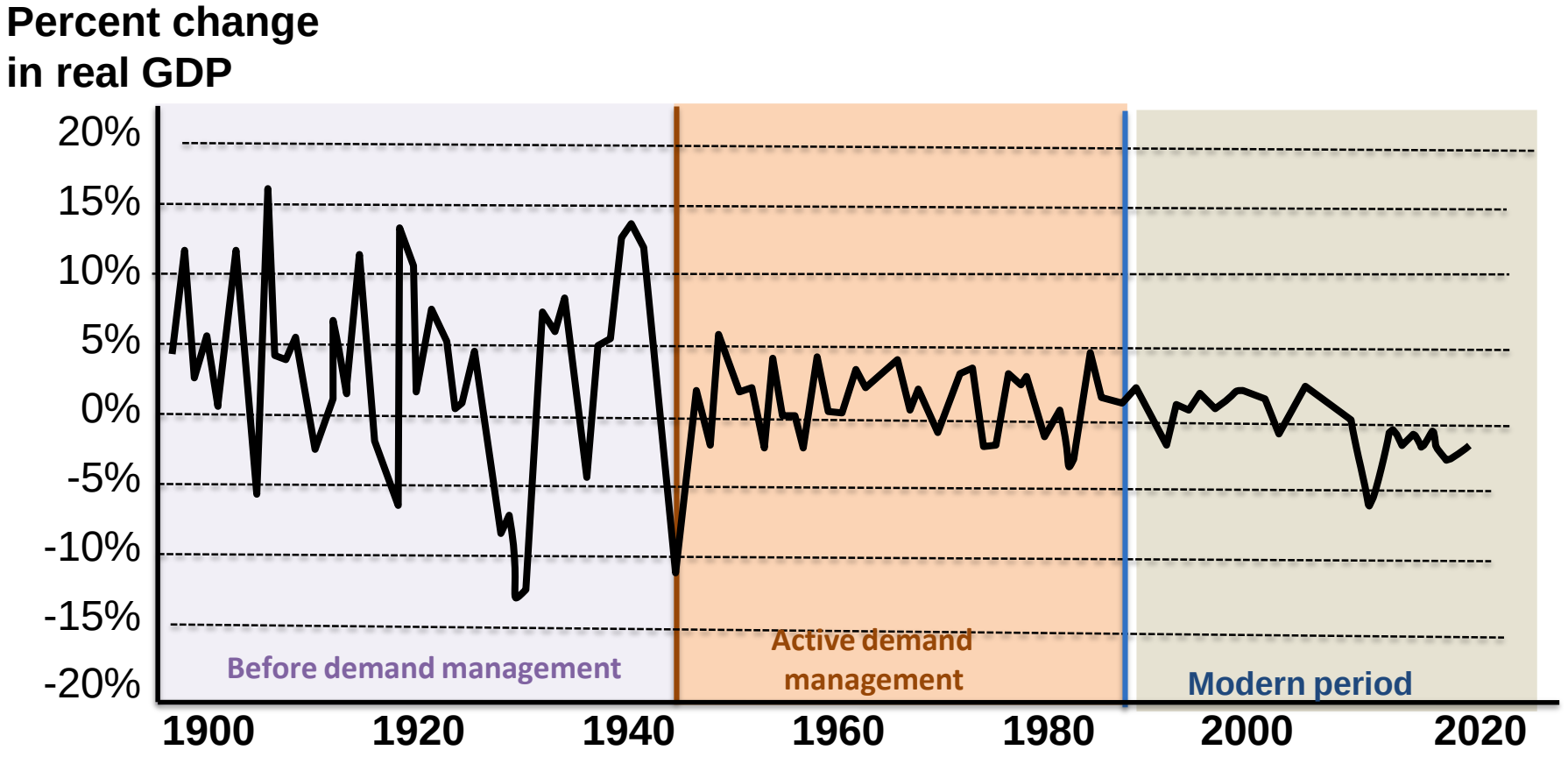
The Negative Side of Automatic Stabilizers

When the economy is first starting to climb out of a recession, automatic stabilizers will slow the process, rather than help it along, for the same reason they slow the contractionary process.

As income increases, automatic stabilizers increase government taxes and decrease government spending, and as they do, the discretionary policy's expansionary effects are decreased.

Decrease in Fluctuations in the Economy

Compared to the early 1900s, fluctuations in the economy have decreased; this suggests that policy makers have done something right.



Conclusion

The modern macro policy precept is a blend of functional and sound finance.

Modern economists' suggestion of government policy in a recession is to do nothing in terms of specific tax or spending policy, but let the automatic stabilizers in the economy do the adjustment. The two exceptions to this rule:

1. When falling into a severe recession or depression, then the government should run expansionary fiscal policy.
2. When experiencing a hyperinflation, the government should run a contractionary fiscal policy.

Chapter Summary (120 of

Sound finance is a view that the government budgetshould always be balanced except in wartime.

The Ricardian equivalence theorem states that it doesn’t matter whether government spending is financed by taxes or deficits; neither would affect theeconomy.

Although proponents of sound finance believed thelogic of the Ricardian equivalence theorem, they believed deficit spending could affect the economy.

Still, because of political and moral issues, proponentsof sound finance promoted balanced budgets.

Chapter Summary (121 of

Functional finance is the theoretical proposition that governments should make spending and taxing decisions based on their effect on the economy, not moralistic principles.

Six problems that make functional finance difficult to implement are:

1. Interest rate crowding out.
2. The government not knowing what the situation is.
3. The government not knowing the economy's potential income.
4. Government's inability to respond quickly enough.
5. The size of government debt not mattering.
6. Conflicting goals.

Chapter Summary (122 of

Activist fiscal policy is now built into U.S. economicinstitutions through automatic stabilizers.

Economists agree that if the economy is headed towarda depression or hyperinflation, follow the precepts of functional finance—expansionary fiscal policy to offset a depression and contractionary fiscal policy to offset hyperinflation. If the economy is experiencing moderate fluctuations, follow the precepts of sound finance—balance the budget.

CHAPTER 7

Inflation, Deflation, and Macro Policy

Chapter Goals

- Know the difference between goods inflation and asset inflation.
- List and discuss the costs and benefits of inflation.
- Summarize the inflation process and the quantity theory of money.
- Define the Phillips curve relationship between inflation and unemployment.

Defining and Measuring Inflation

Inflation is a continuous rise in the price level and is measured with price indexes.

There are two types of inflation:

- Goods price inflation
- Asset price inflation

Asset prices and goods prices don't always move in tandem because there are periods of asset price bubbles.

Defining and Measuring Inflation

Asset price inflation occurs when the prices of assets rise more than their "real" value.

Assets include: gold, houses, artwork, collectibles, land, stocks, bonds and many other items that people hold as a store of wealth.

There is no measure of asset price inflation since it's difficult to know when the real value of assets increase.

Does Asset Inflation Matter?

- The ratio of nominal wealth to nominal GDP can serve as a rough estimate whether asset price inflation exceeds goods price inflation.
- Asset price inflation can lead to serious misallocation of resources from conservative to risky investments.
- Asset deflation reverses many of the positive effects of asset inflation.
- The pain caused by the asset price deflation exceeds the pleasure caused by the asset price inflation.

The Distributional Costs of Inflation

Unexpected inflation redistributes income from lendersto borrowers.

- If lenders charge a nominal rate of 5% and expect inflation to be 2%, the expected real rate is 3%.
- If inflation is actually 4%, the real rate is only 1%.

People who do not expect inflation or who are tied to fixed nominal contracts will likely lose in an inflationaryperiod.

The Distributional Costs ofAsset Price Inflation

People who bet on rising asset prices are helped and those did not are hurt.

Cautious borrowers are hurt because they see the asset prices as being too high, and choose not to borrow.

Less cautious borrowers are helped because they borrow at low interest rates and receive high returns when their assets increase in value.

The Benefits of (Low) Inflation

Inflation can facilitate relative price changes.

Allowing more expansionary monetary policy.

> **Zero interest rate lower bound** – a limit on how much interest rates can fall.

Inflation as a placebo – inflation pushes up the value of assets which encourages people to invest.

The Danger of Accelerating Inflation

Asset price inflation redistributes wealth from cautiousindividuals to less cautious individuals.

Goods price inflation redistributes income, and reducesthe amount of information prices are supposed to convey.

Inflation is a very serious problem if it increases to **hyperinflation,** when inflation hits triple digits, 100percent or more a year.

Hyperinflation breaks down confidence in the monetary system, the economy, and the government.

The Inflation Process and The QuantityTheory of Money

Expectations play a key role in the inflationary process.

Rational expectations are the expectations that the economists' models predict.

Adaptive expectations are expectations based in some way on the past.

Extrapolative expectations are expectations that a trend will continue.

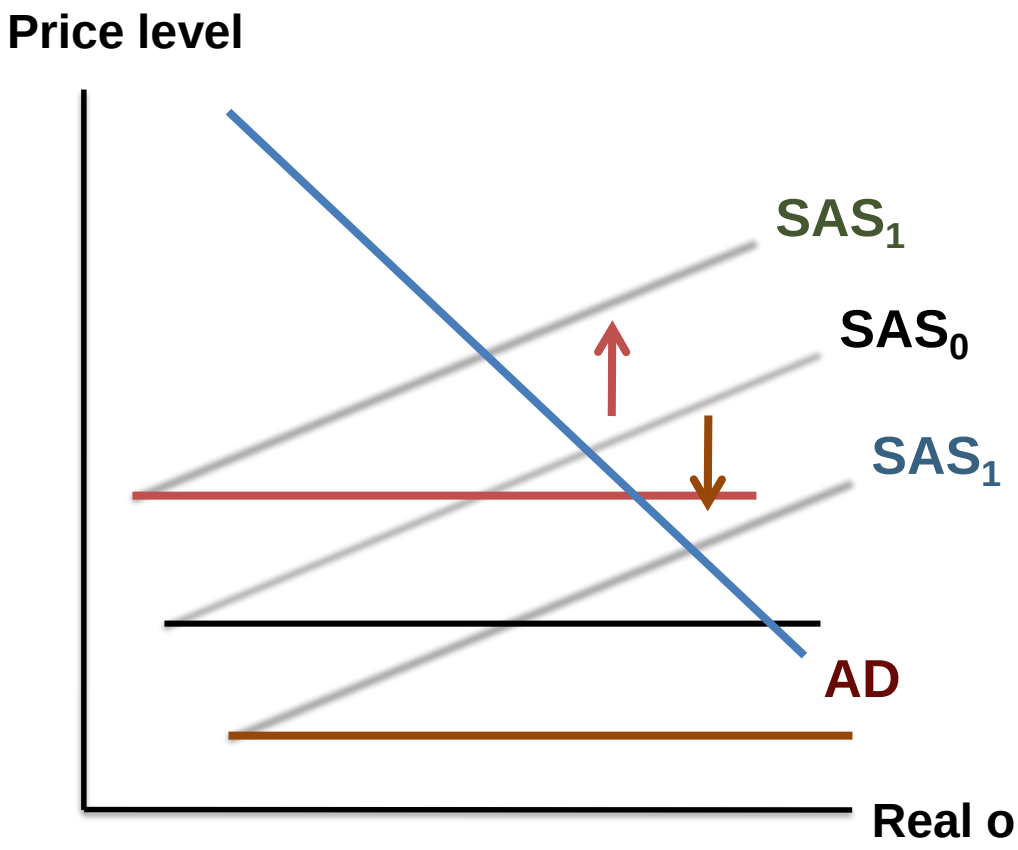
Productivity, Inflation, and Wages

Changes in productivity and changes in wages determine whether inflation may be coming.

There will be no inflationary pressures if wages and productivity increase at the same rate.

Inflation = Nominal wage increases – Productivity growth

Nominal Wages, Productivity, and Inflation



When nominal wages increase by more than the growth of productivity, the SAS curve shifts up, resulting in inflation.

When nominal wages increase by less than the growth of productivity, the *SAS curve shifts* down, resulting in deflation.

The Quantity Theory of Money and Inflation

The **quantity theory** emphasizes the connection between money and inflation.

The **equation of exchange** is: **MV = PQ**

M = Quantity of money Q = Real output

V = Velocity of money P = Price level

Velocity of money is the number of times per year, on average, a dollar gets spent on goods and services.

$$\text{Velocity} = \frac{\text{Nominal GDP}}{\text{Money Supply}}$$

Three Assumptions of Quantity Theory

1. Velocity is constant.
2. Real output (Q) is independent of money supply.
    - Q is autonomous, determined by forces outside those in the quantity theory.
3. Causation goes from money to prices.
    - The quantity theory says that the price level varies in response to changes in the quantity of money.
    - $\%\Delta M \rightarrow \%\Delta P$
    - $MV \rightarrow PQ$

The Declining Influence ofthe Quantity Theory

Velocity is not constant: Since 2008 velocity has decreased enormously.

Breakdown in the connection between money and inflation: In 2008, the money supply fell significantly, but goods inflation hardly fell at all.

Even though the quantity theory is no longer directly applicable, its general point remains

relevant.

Inflation and the Phillips Curve Trade-Off

The **short-run Phillips curve** is a downward-sloping curve showing the relationship between inflation and unemployment when expectations of inflation are constant.

In the 1970s, there was **stagflation**, the combination of high and accelerating inflation and high unemployment.

The Long-Run and Short-RunPhillips Curves

Actual inflation depends both on supply and demandforces and on how much inflation people expect.

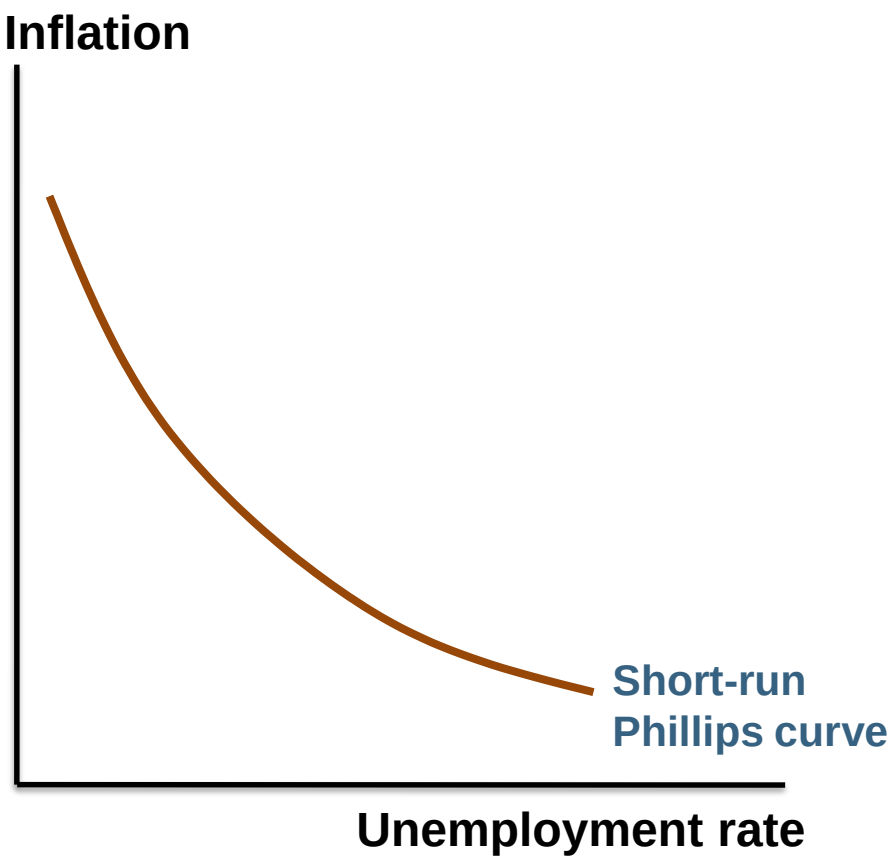
At all points on the **short-run Phillips curve**, expectations of inflation (the rise in the price level thatthe average person expects) are fixed.

At all points on the **long-run Phillips curve**, expectations of inflation are equal to actual inflation.

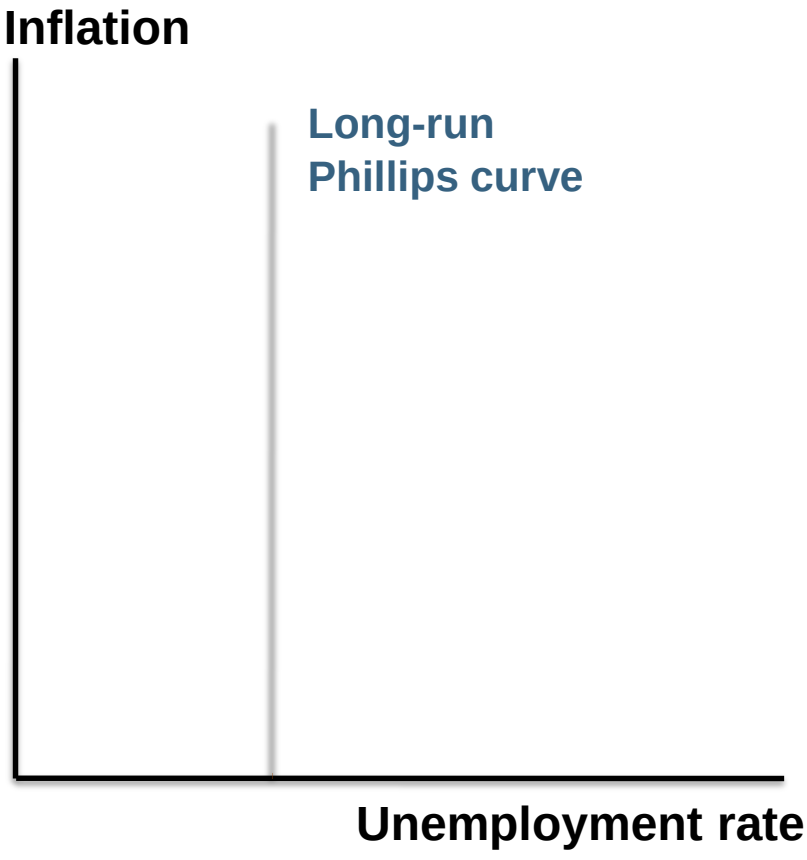
The ***long-run Phillips curve*** is a vertical curve at the unemployment rate consistent with potential output.

The Phillips Curve Trade-Off

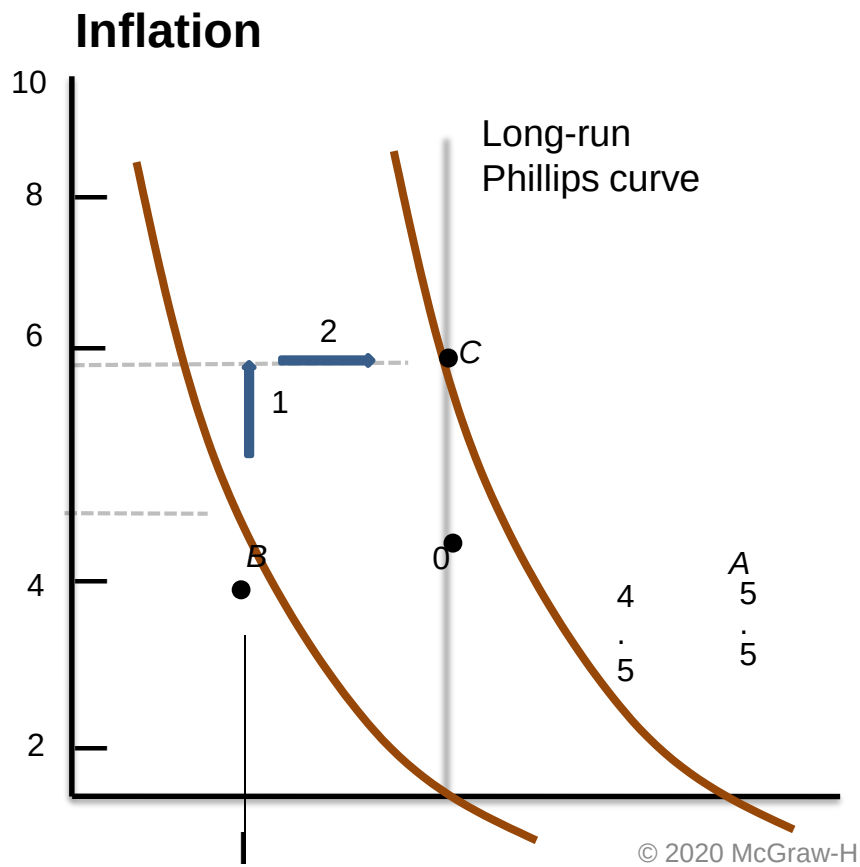
In the short-run Phillips curve, there is a trade-off between inflation and unemployment.



In the long-run Phillips curve, there is no trade-off; curve is vertical.



Moving Off the Long-Run Phillips Curve

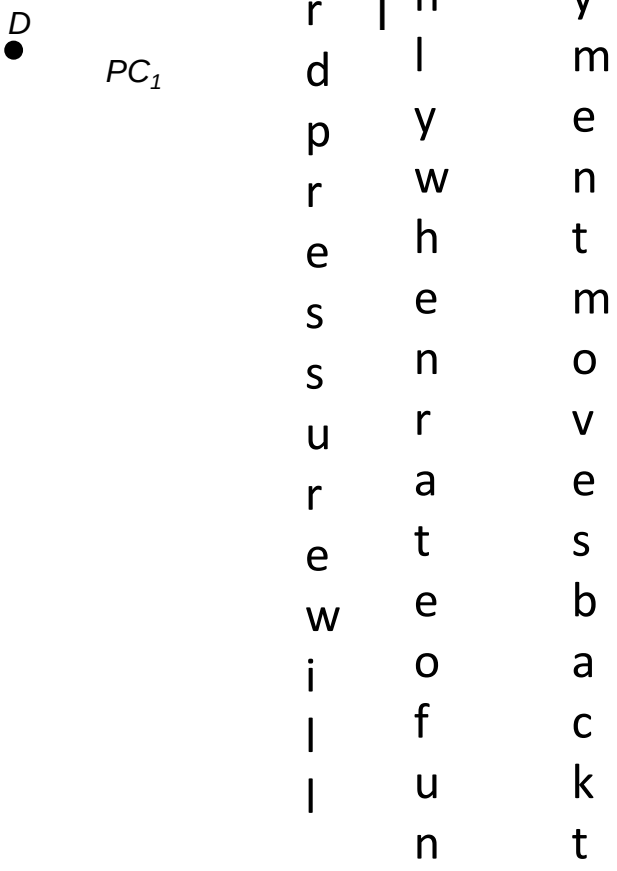


Economy is initially at point *A* when the government runs expansionary policy to reduce unemployment below 5.5 percent.

Economy moves from point *A* to point *B.*

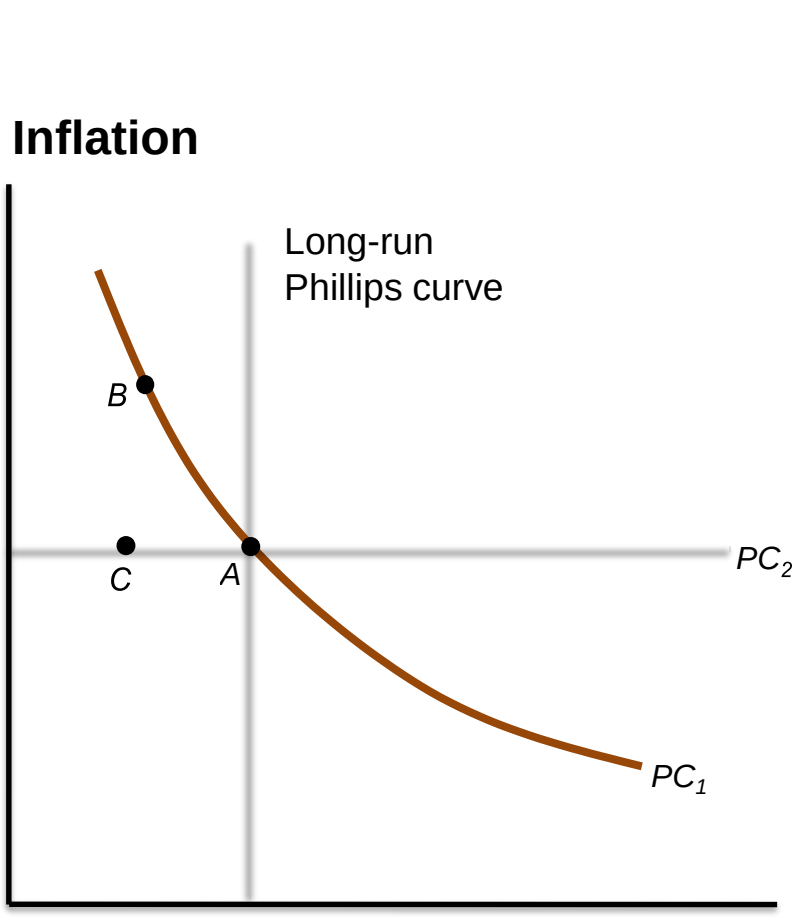
Expectations of inflation increase, and the short-run Phillips curve begins shifting up (arrow 1).

6.5



Unemployment rate

Global Competition and the Phillips Curve



When the world price level is below the domestic price level, inflation is held down by globalization.

A decline in the unemployment rate willnot lead to inflation.

The standard short-run Phillips curve (PC_1) changes to a flat short-run Phillips curve (PC_2).

Chapter Summary (146 of

At one time, inflation was measured as an increase in the money supply.

Inflation can occur for both goods and assets.

The standard goods market price indexes for judging policies are limited as they do not include the prices of assets.

The winners in inflation are people who can raise their wages or prices and still keep their jobs or sell their goods.

The losers in inflation are people who can’t raise their wages or prices.

Chapter Summary (147 of

Asset inflation hurts people who save with safe assetsand helps those who save in risky assets.

Inflation has both costs and benefits. Conventional monetary policy emphasizes informational, institutionaland distributional costs.

Inflation equals nominal wage increases minus productivity growth.

Expectations of inflation can accelerate inflation and insome cases lead to hyperinflation.

According to the quantity theory of money, policy analysis about the real economy is based on the supplyside of the economy.

The lack of a clear relationship between money growth and inflation undermines the quantity theory of money.

The short-run Phillips curve holds expectations constant; The long-run Phillips curve allows expectations of inflation to change; globalization canlead to a flat short-run Phillips curve.

1 Exchange Rate Essentials

An exchange rate (E) is the price of some foreign currency expressed in terms of a home (or domestic) currency.

- Because an exchange rate is the relative price of two currencies, it may be quoted in either of two ways:
  - The number of home currency units that can be exchanged for one unit of foreign currency
  - The number of foreign currency units that can be exchanged for one unit of home currency
- *To avoid confusion, we must specify which country is the home country and which is foreign.*

1 Exchange Rate Essentials

Defining the Exchange Rate

When we refer to a particular country's exchange rate, we will quote it in units of home currency per units of foreign currency.

- For example:
  - The U.S. exchange rate with Japan is quoted as U.S. dollars per yen (or $/¥).
  - Denmark's exchange rate with the Eurozone is quoted as Danish krone per euro (or kr/€).

1 Exchange Rate Essentials

TABLE 2-1

Exchange Rate Quotations This table shows major exchange rates as they might appear in the financial media. Columns (1) to (3) show rates on December 31, 2015. For comparison, columns (4) to (6) show rates on December 31, 2014. For example, column (1) shows that at the end of 2015, one U.S. dollar was worth 1.501 Canadian dollars, 6.870 Danish krone, 0.921 euros, and so on. The euro–dollar rates appear in bold type.

		EXCHANGE RATES ON DECEMBER 31, 2015			EXCHANGE RATES ON DECEMBER 31, 2014 *ONE YEAR PREVIOUSLY*		
		(1)	(2)	(3)	(4)	(5)	(6)
Country (currency)	**Currency Symbol**	**Per $**	**Per €**	**Per £**	**Per $**	**Per €**	**Per £**
Canada (dollar)	C$	1.501	1.389	2.047	1.158	1.402	1.806
Denmark (krone)	DKr	6.870	7.463	10.13	6.154	7.446	9.595
Eurozone (euro)	€	**0.921**	—	1.357	**0.826**	—	1.289
Japan (yen)	¥	120.3	130.7	177.3	119.9	145.1	187.0
Norway (krone)	NKr	8.851	9.612	13.05	7.498	9.072	11.69
Sweden (krona)	SKr	8.431	9.158	12.43	7.828	9.473	12.21
Switzerland (franc)	SFr	1.001	1.087	1.485	0.994	1.202	1.549
United Kingdom (pound)	£	0.679	0.737	—	1.559	0.776	—
United States (dollar)	$	—	**1.086**	1.474	—	**1.210**	1.559

$E_{\$/€}$ = 1.086 = U.S. exchange rate (American terms)

$E_{€/\$}$ = 0.921 = Eurozone exchange rate (European terms)

$$E_{\$/€} = \frac{1}{E_{€/\$}} \qquad 1.086 = \frac{1}{0.921}$$

Appreciations and Depreciations

- If one currency buys more of another currency, we say it has experienced an **appreciation**.
  - We also might say it has *risen in value*, *appreciated*, or *strengthened* against the other currency.
- If a currency buys less of another currency, we say it has experienced a **depreciation**.
  - We also might say it has *fallen in value*, *depreciated*, or *weakened* against the other currency.

Appreciations and Depreciations

In U.S. terms, the following holds true:

- When the U.S. exchange rate $E_{\$/€}$ *rises*, more dollars are needed to buy one euro. The price of one euro goes up in dollar terms, and the U.S. dollar experiences a depreciation. It has fallen in value or weakened against the euro.

- When the U.S. exchange rate $E_{\$/€}$ *falls*, fewer dollars are needed to buy one euro. The price of one euro goes down in dollar terms, and the U.S. dollar experiences an appreciation. It has risen in value or strengthened against the euro.

Appreciations and Depreciations

To determine the size of an appreciation or depreciation, we compute the proportional change, as follows:

- In 2014, at time *t*, the dollar value of the euro was
  $E_{\$/€,t} = \$\ 1.211.$
- In 2015, at time $t + 1$, the dollar value of the euro was
  $E_{\$/€,t+1} = \$\ 1.086.$
- The change in the dollar value of the euro was
  $\Delta E_{\$/€,t} = 1.086 - 1.211 = -\$\ 0.125.$
- The percentage change was
  $\Delta E_{\$/€,t} / E_{\$/€,t} = -0.125/1.211 = -10.32\%.$
- Thus, the dollar *appreciated* against the euro by 10.32%.

Appreciations and Depreciations

Similarly, over the same year:

- In 2014, at time *t*, the euro value of the dollar was
  $E_{€/\$,t} = € 0.826.$
- In 2015, at time $t + 1$, the euro value of the dollar was
  $E_{€/\$,t+1} = € 0.921.$
- The change in the euro value of the dollar was
  $\Delta E_{€/\$,t} = 0.921 - 0.826 = + € 0.095.$
- The percentage change was
  $\Delta E_{€/\$,t} / E_{€/\$,t} = + 0.095/0.826 = + 11.50\%.$
- Thus, the euro *depreciated* against the dollar by 11.50%.

2 Exchange Rates in Practice

Exchange Rate Regimes: Fixed Versus Floating

There are two major types of **exchange rate regimes**—fixed and floating:

- A **fixed** (or **pegged**) **exchange rate** fluctuates in a narrow range (or not at all) against some *base currency* over a sustained period. The exchange rate can remain fixed for long periods only if the government intervenes in the foreign exchange market in one or both countries.
- A **floating** (or **flexible**) **exchange rate** fluctuates in a wider range, and the government makes no attempt to fix it against any base currency. Appreciations and depreciations may occur yearly, monthly, by the day, or even every minute.

APPLICATION

FIGURE 2-2 (2 of 2) Exchange Rate Behavior: Selected Developed Countries, 1996–2015 (cont.)

This figure shows exchange rates of three currencies against the euro, which was introduced in 1999. The pound and the yen float against the euro. The Danish krone provides an example of a fixed exchange rate. There is only a tiny variation around this rate, no more than plus or minus 2%. This type of fixed regime is known as a **band**.

2 Exchange Rates in Practice

How the Euro is quoted

- 8 September, €1 = $1.18

- The convention in Economics is: #?H/1F (also called *direct quote*). It makes sense: “buy low, sell high” (the F-currency)
- If Home is EA, then E(€/$) = 1/1.18€ for 1$ = 0.8475 €/$

- However, the euro is usually quoted as #?F/1H (also called *direct quote*).
- In this case, E(€/$) = 1.18$/1€ or simply 1.18$.

Consumption

- The simplest model of aggregate private consumption relates household **consumption** C to **disposable income** Y^d.

$$Consumption = C = C(Y - \overline{T})$$

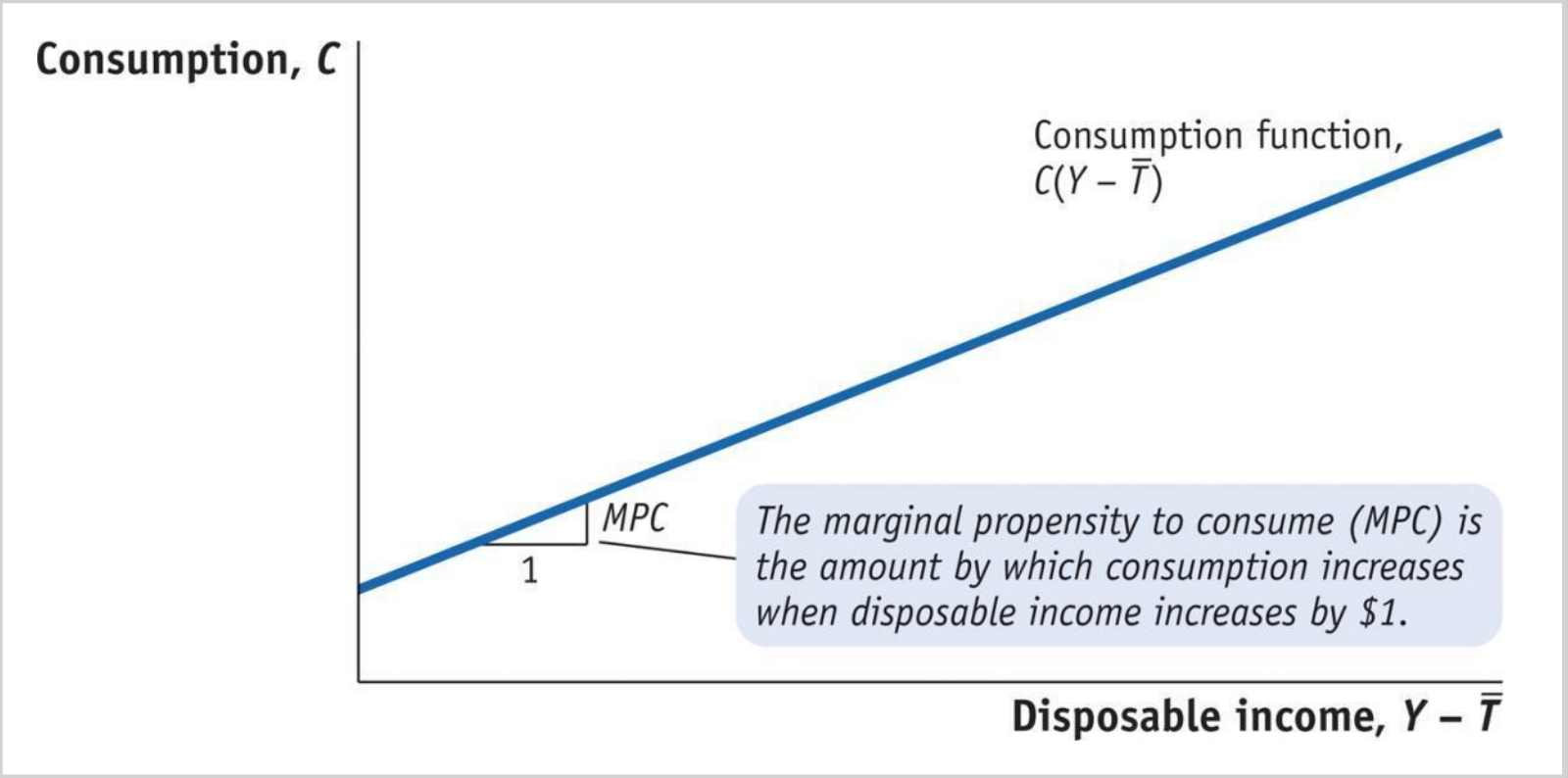
- This equation is known as the *Keynesian consumption function.*

Marginal Effects The slope of the consumption function is called the **marginal propensity to consume** (*MPC*). We can also define the *marginal propensity to save* (*MPS*) as $1 - MPC$.

1 Demand in the Open Economy

Consumption

FIGURE 7-1



The Consumption Function The consumption function relates private consumption, C, to disposable income, $Y - \bar{T}$. The slope of the function is the marginal propensity to consume, *MPC*.

Investment

- The firm's borrowing cost is the **expected real interest rate** r^e, which equals the nominal interest rate i minus the expected rate of inflation π^e:

$$r^e = i - \pi^e.$$

- Since expected inflation is zero, the expected real interest rate equals the nominal interest rate, $r^e = i$.

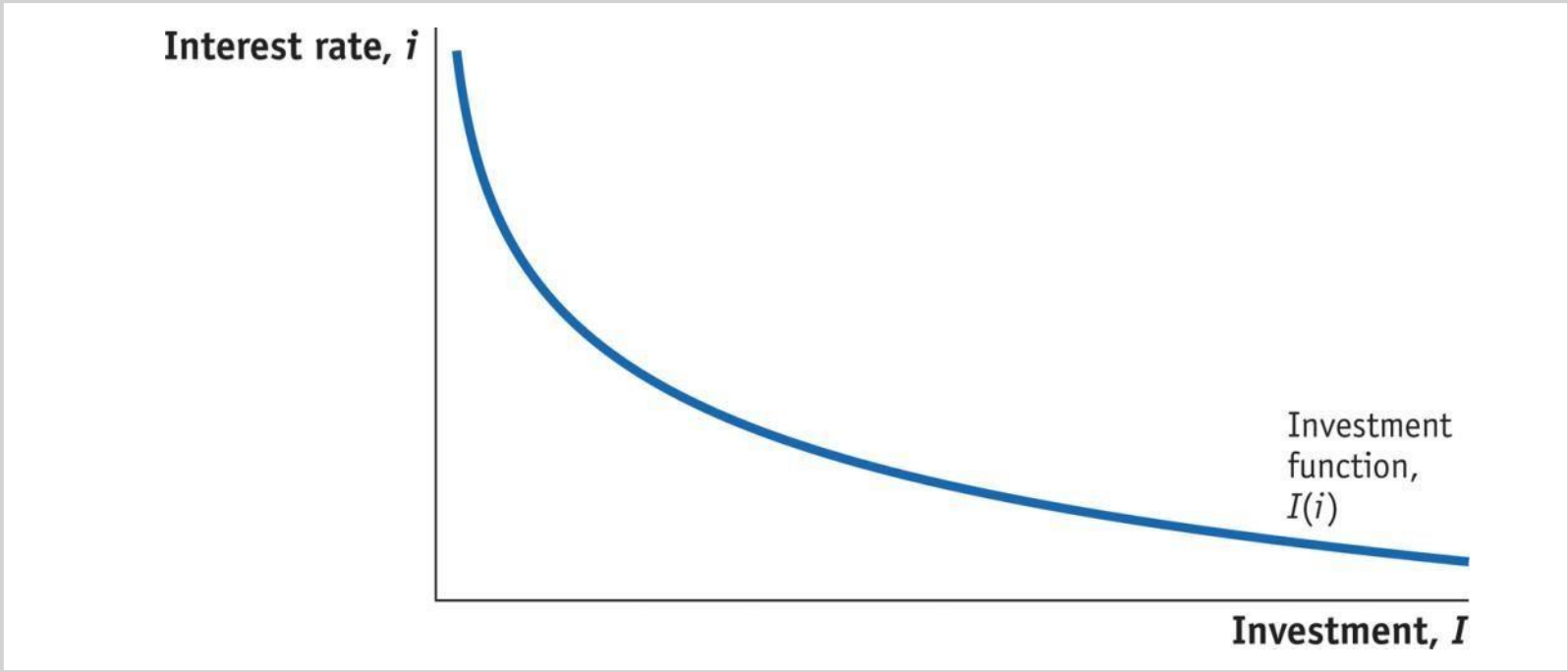
- Investment I is a decreasing function of the real interest rate. So investment $I(r)$ falls as the real interest rate rises.

- But expected inflation is zero, so the real interest rate equals the nominal interest rate. We can then write $I(i)$.

1 Demand in the Open Economy

Investment

FIGURE 7-2



The Investment Function The investment function relates the quantity of investment, I, to the level of the expected real interest rate, which equals the nominal interest rate, i, when (as assumed in this chapter) the expected rate of inflation, π^e, is zero. The investment function slopes downward: as the real cost of borrowing falls, more investment projects are profitable.

1 Demand in the Open Economy

The Government

- Assume that the government collects an amount $\bar{T}$ of **taxes**

  from households and spends an amount G on **government consumption**.

- We will ignore government **transfer programs**, such as social security, medical care, or unemployment benefit systems.

- In the unlikely event that $G = \bar{T}$ exactly, we say that the

  government has a *balanced budget.*

- If $\bar{T} > G$Пь, the government is said to be running a *budget surplus*

(of size $\bar{T} - G$).

- If $G > \bar{T}$, there is a *budget deficit* (of size $-\bar{T}$ or, equivalently, a negative surplus of $\bar{T} - G$).

The Trade Balance

The Role of the Real Exchange Rate

- When aggregate spending patterns change due to changes in the real exchange rate, this is **expenditure switching** from foreign purchases to domestic purchases.
- If home's exchange rate is E, and home and foreign price levels are $\bar{P}$ and $\bar{P}^*$ (both fixed in the short run), the real exchange rate q of Home is defined as $q = E\,\bar{P}^* / \bar{P}$.
  - *We expect the trade balance of the home country to be an increasing function of the home country's real exchange*

rate. As the home country's real exchange rate rises, it will export more and import less, and the trade balance rises.

The Trade Balance

The Role of Income Levels

- *We expect an increase in home income to be associated with an increase in home imports and a fall in the home country's trade balance.*
- *We expect an increase in rest of the world income to be associated with an increase in home exports and a rise in the home country's trade balance.*

- The trade balance is, therefore, a function of three variables: the real exchange rate, home disposable income, and rest of world disposable income.

$$TB = TB\left(\underbrace{\bar{E}\bar{P}^{*}/\bar{P}}, \underbrace{Y - \bar{T}}, \underbrace{Y^{*} - \bar{T}^{*}}\right)$$

Increasing f u

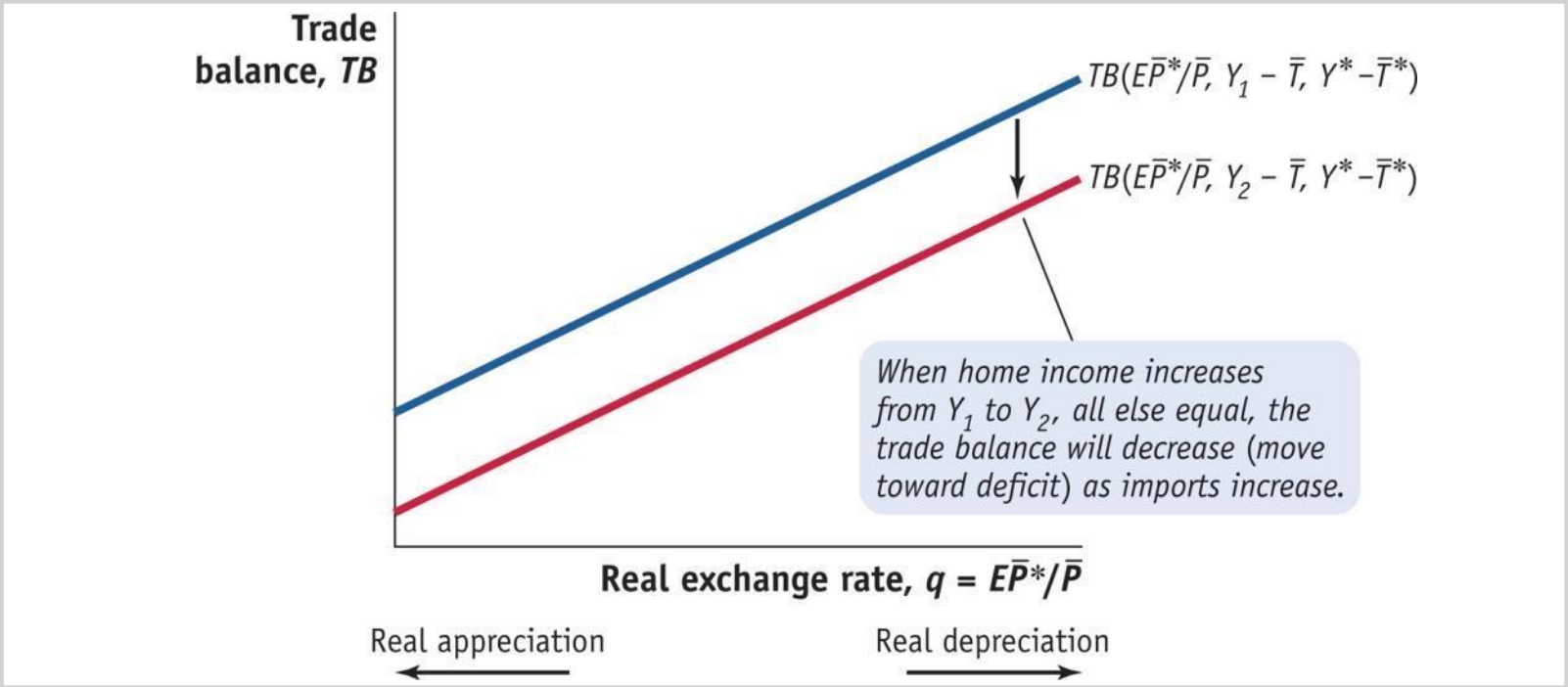
1 Demand in the Open Economy

tion Decreasing function Increasing function

1 Demand in the Open Economy

The Trade Balance

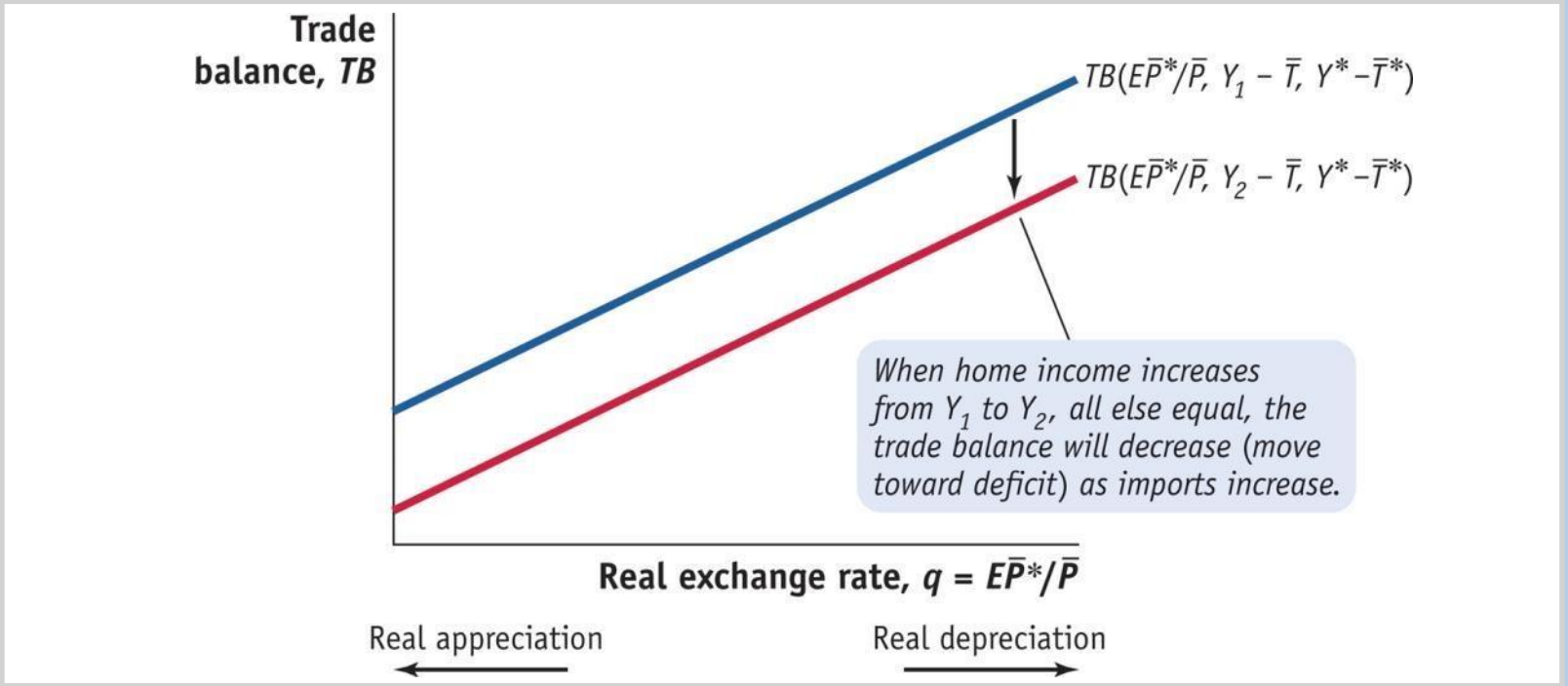
FIGURE 7-3 (1 of 2) The Trade Balance and the Real Exchange Rate



The trade balance is an increasing function of the real exchange rate, EP^*/P. When there is a real depreciation (a rise in q), foreign goods become more expensive relative to home goods, and we expect the trade balance to increase as exports rise and imports fall (a rise in TB) This is a movement *along* this line.

The Trade Balance

FIGURE 7-3 (2 of 2) The Trade Balance and the Real Exchange Rate (continued)



The trade balance may also depend on income. If home income rises, then some of the increase in income may be spent on the consumption of imports. For example, if home income rises from Y_1 to Y_2, then the trade balance will decrease, whatever the level of the real exchange rate, and the trade balance function will shift down.

Supply and Demand

Given our assumption that the current account equals the trade balance, gross national income Y equals GDP:

$$\text{Supply} = GDP = Y$$

Aggregate demand, or just "demand," consists of all the possible sources of demand for this supply of output.

$$\text{Demand} = D = C + I + G + TB$$

Substituting, we have

$$D = C\left(Y - \overline{T}\right) + \underset{(i)}{I} + \overline{G} + TB\left(E\overline{P}^{*}\mathrm{T}\,\overline{P}, Y - \overline{T}, Y^{*} - \overline{T}^{*}\right)$$

The goods market equilibrium condition is

$$Y = \underbrace{C\left(Y - \overline{T}\right) + I(i) + \overline{G} + TB\left(E\overline{P}^{*}\mathrm{T}\,\overline{P}, Y - \overline{T}, Y^{*} - \overline{T}^{*}\right)} \qquad (7\text{-}1)$$

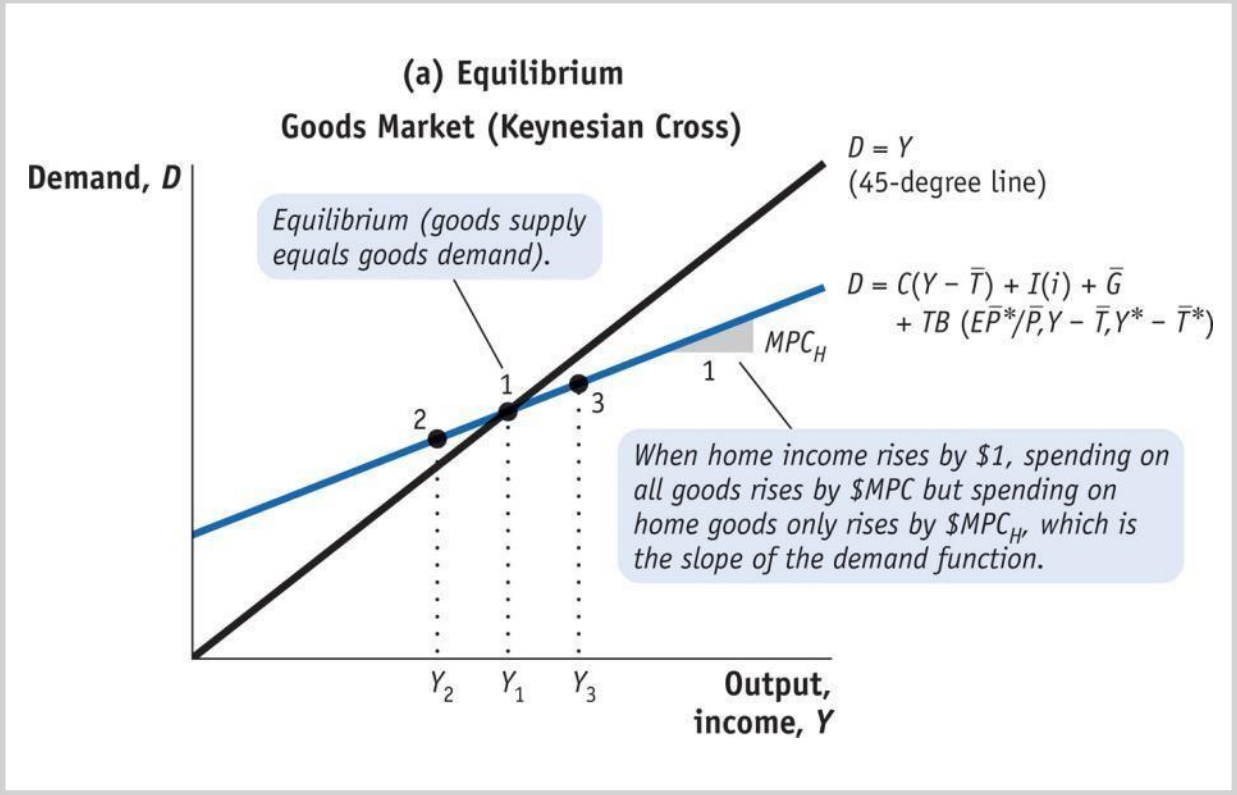
2 Goods Market Equilibrium: The Keynesian Cross

D

2 Goods Market Equilibrium: The Keynesian Cross

Determinants of Demand

FIGURE 7-7 (a) (1 of 2) The Goods Market Equilibrium and the Keynesian Cross

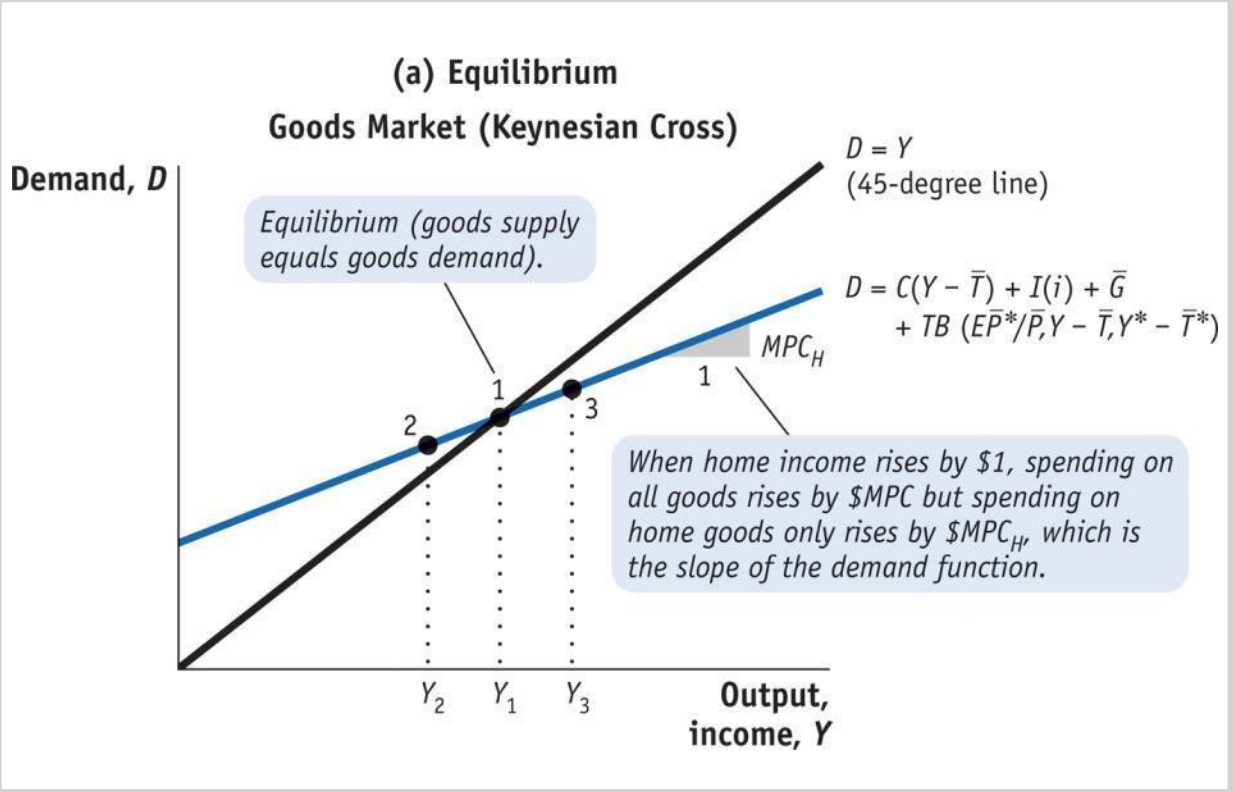


Equilibrium is where demand, D, equals real output or income, Y. In this diagram, equilibrium is at point 1, at an income or output level of Y_1. The goods market will adjust toward this equilibrium.

2 Goods Market Equilibrium: The Keynesian Cross

Determinants of Demand

FIGURE 7-7 (a) (2 of 2) The Goods Market Equilibrium and the Keynesian Cross (continued)



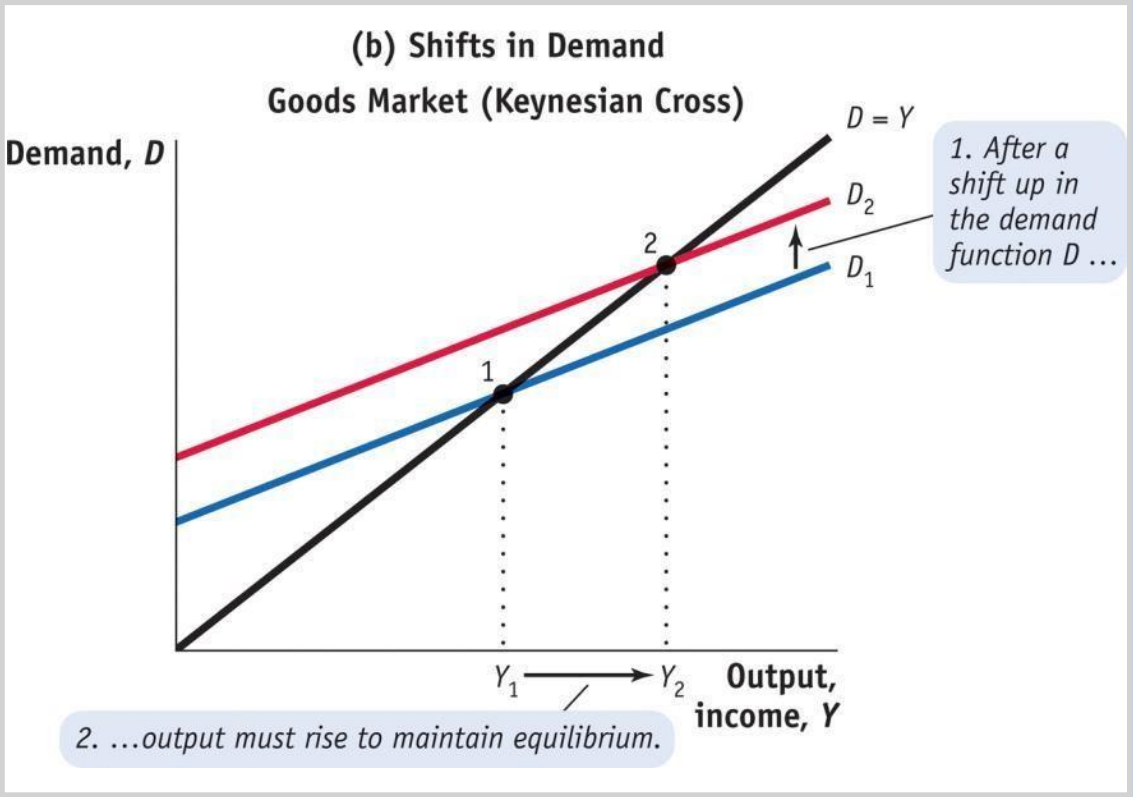
At point 2, the output level is Y_2 and demand, D, exceeds supply, Y; as inventories fall, firms expand production and output rises toward Y_1.

At point 3, the output level is Y_3 and supply Y exceeds demand; as inventories rise, firms cut production and output falls toward Y_1.

2 Goods Market Equilibrium: The Keynesian Cross

Determinants of Demand

FIGURE 7-7 (b) Shifts in Demand



The goods market is initially in equilibrium at point 1, at which point demand and supply both equal Y_1.

An increase in demand, D, at all levels of real output, Y, shifts the demand curve up from D_1 to D_2.

Equilibrium shifts to point 2, where demand and supply are higher and both equal Y_2. Such an increase in demand could result from changes in one or more of the components of demand: C, I, G, or TB.

2 Goods Market Equilibrium: The Keynesian Cross

Summary

Rise in government spending G
Fall in taxes T
Fall in the home interest rate i
Rise in the nominal exchange rate E
Rise in foreign prices P*
Fall in home prices P
Any shift up in the consumption function C
Any shift up in the investment function I
Any shift up in the trade balance function TB

$\Rightarrow$ Demand curve D shifts up

Increasing demand D at a given level of output Y

The opposite changes lead to a decrease in demand and shift the demand curve in.

3 Goods and Forex Market Equilibria: Deriving the IS Curve

Equilibrium in Two Markets

- A general equilibrium requires equilibrium in all markets—that is, equilibrium in the goods market, the money market, and the forex market.
- *The* **IS curve** *shows combinations of output Y and the interest rate i for which the goods and forex markets are in equilibrium.*

Forex Market Recap

Uncovered interest parity (UIP) Equation (10-3):

$$\underbrace{i}_{\text{Domestic intrest rate}} = \underbrace{i^{*}}_{\text{Foreign interest rate}} + \underbrace{\underbrace{\left(\frac{E^{e}}{E} - 1\right)}_{\text{Expected rate of depreciation of the domestic currency}}}_{\text{Domestic return}}$$

3 Goods and Forex Market Equilibria: Deriving the IS Curve

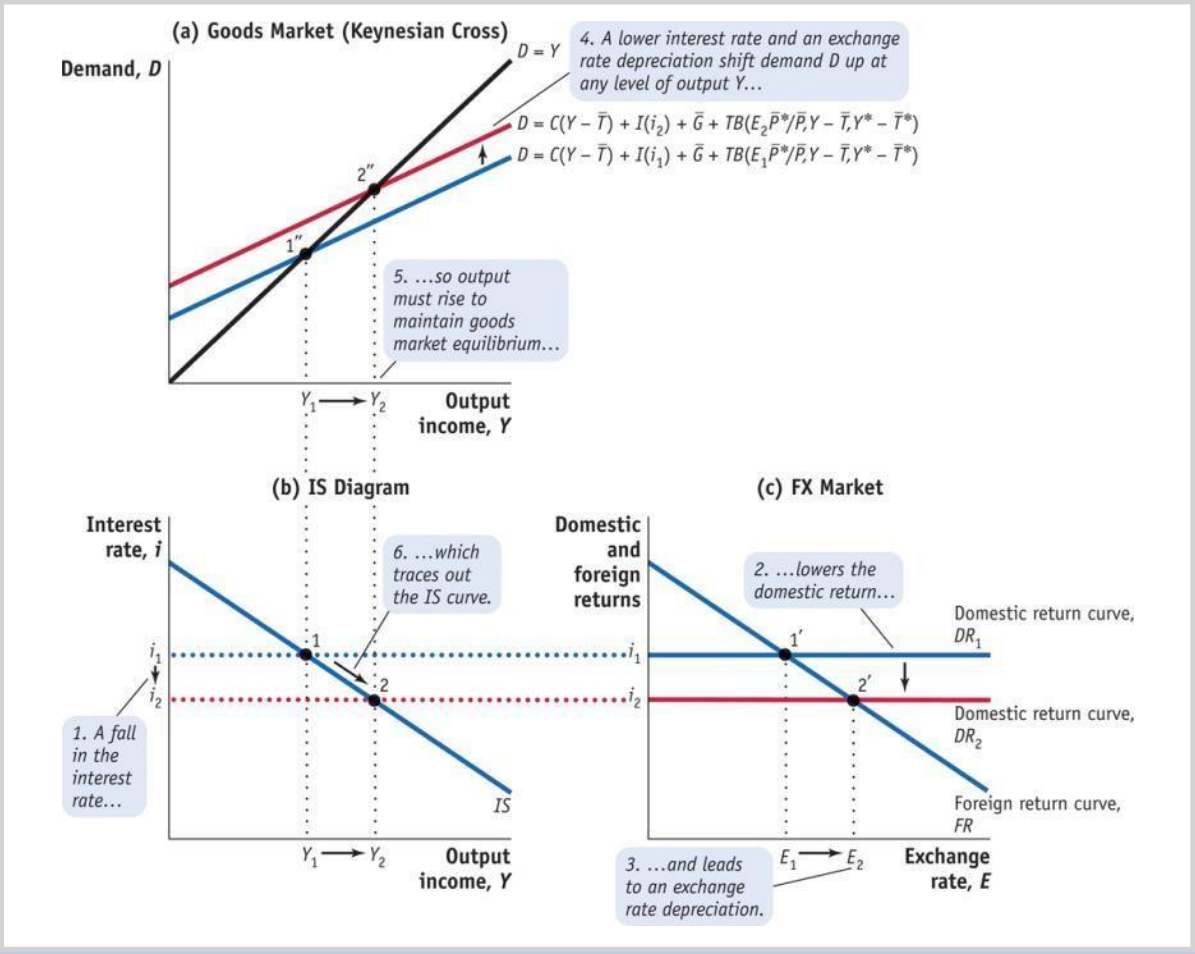
Expected foreign return

Domestic return

3 Goods and Forex Market Equilibria: Deriving the IS Curve

Equilibrium in Two Markets

FIGURE 7-8 (1 of 3) Deriving the IS Curve



The **Keynesian cross** is in panel (a), the IS curve is in panel (b), and the forex (FX) market is in panel (c).

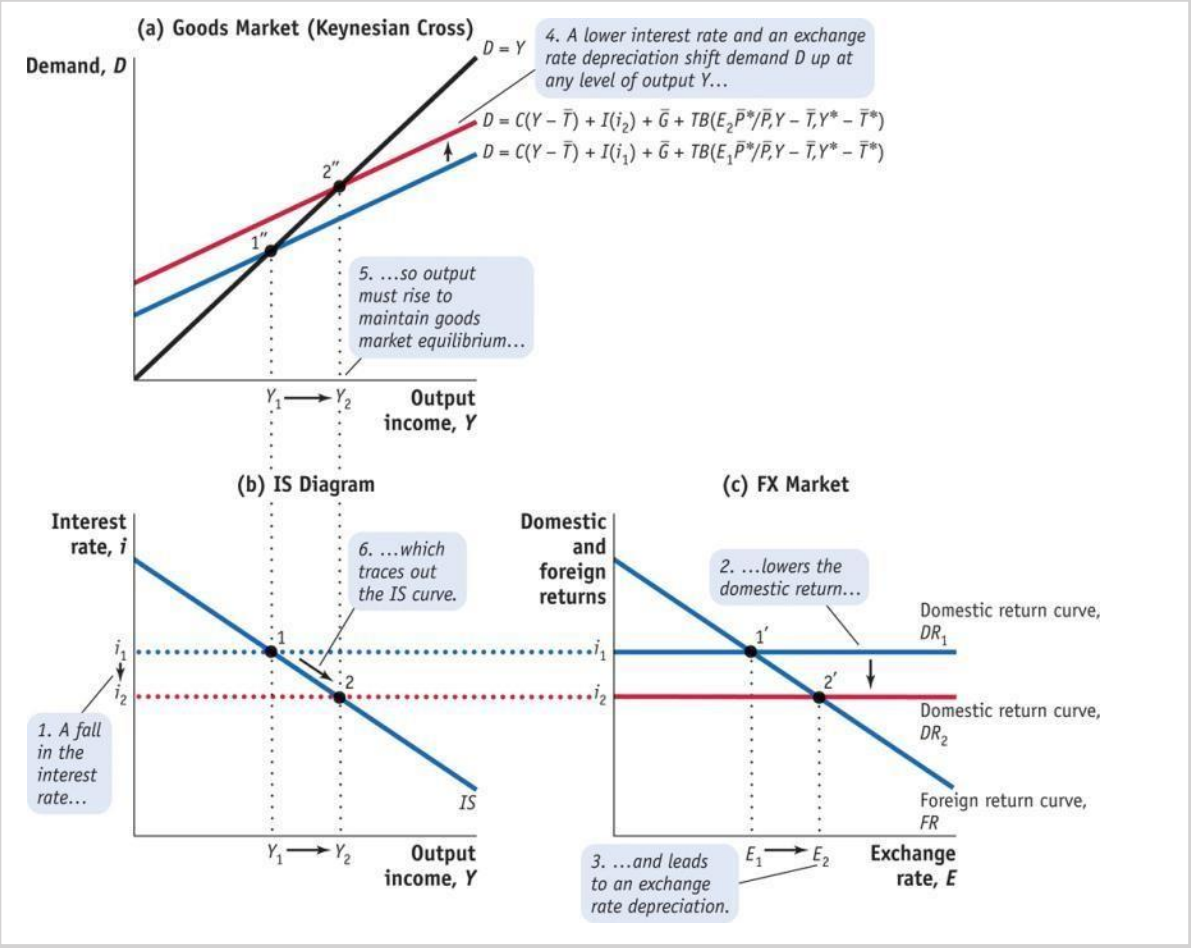
The economy starts in equilibrium with output, Y_1; interest rate, i_1; and exchange rate, E_1.

Consider the effect of a decrease in the interest rate from i_1 to i_2, all else equal. In panel (c), a lower interest rate causes a depreciation; equilibrium moves from 1′ to 2′.

3 Goods and Forex Market Equilibria: Deriving the IS Curve

Equilibrium in Two Markets

FIGURE 7-8 (2 of 3) Deriving the IS Curve (continued)

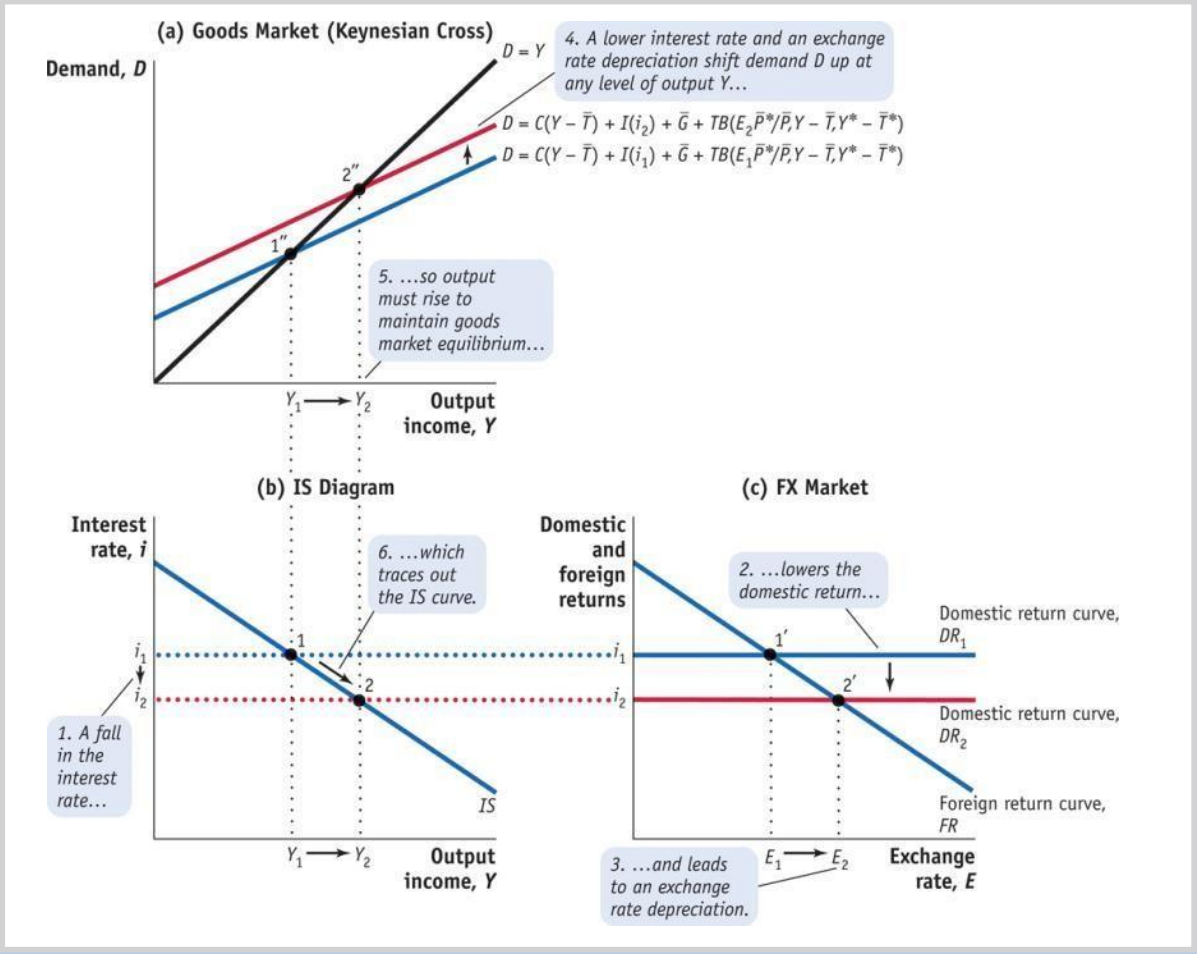


A lower interest rate boosts investment and a depreciation boosts the trade balance.

In panel (a), demand shifts up from D_1 to D_2, equilibrium from 1″ to 2″, and output from Y_1 to Y_2.

Equilibrium in Two Markets

FIGURE 7-8 (3 of 3) Deriving the IS Curve (continued)



In panel (b), we go from point 1 to point 2. The IS curve is thus traced out, a downward-sloping relationship between the interest rate and output.

When the interest rate falls from i_1 to i_2, output rises from Y_1 to Y_2.

The IS curve describes all combinations of i and Y consistent with goods and FX market equilibria in panels (a) and (c).

Deriving the IS Curve

Two important observations are in order:

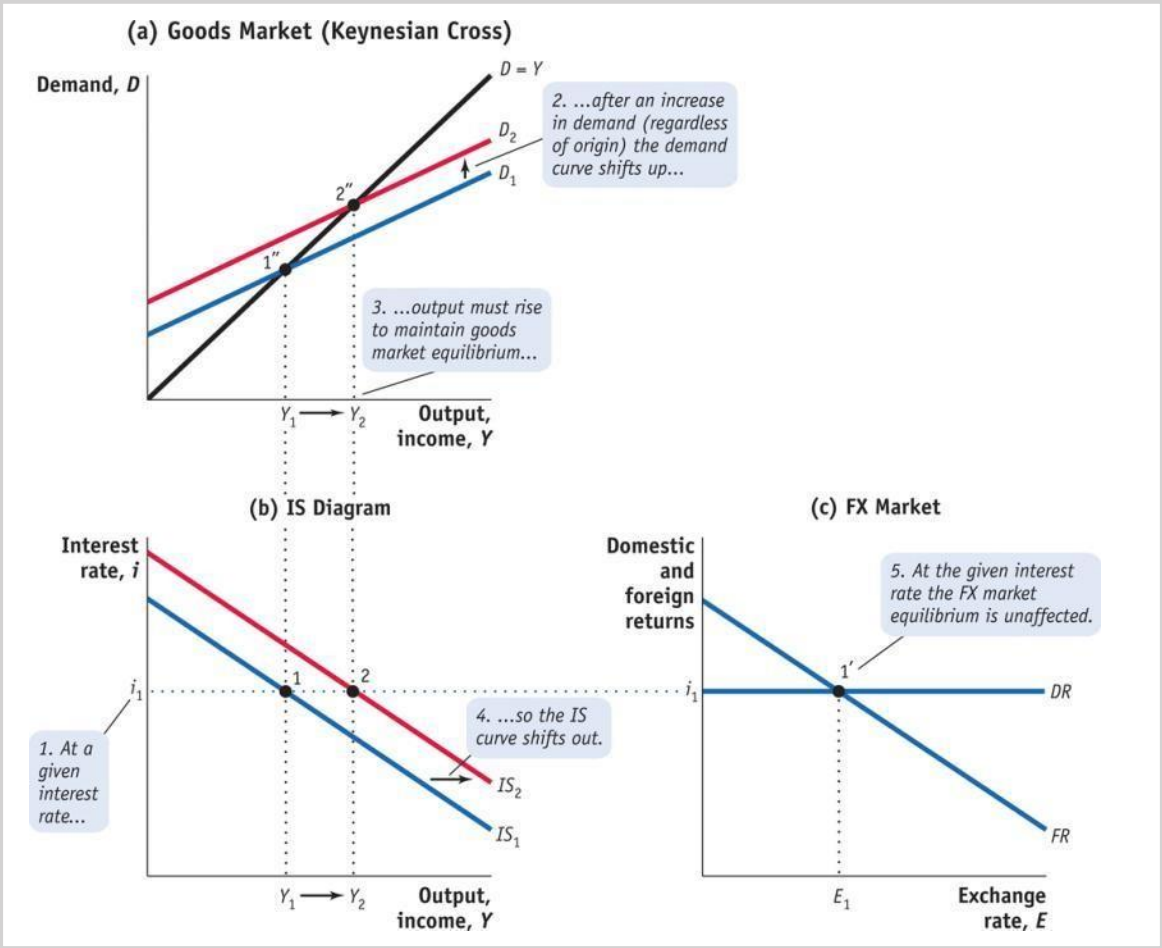
- In an open economy, lower interest rates stimulate demand through the traditional closed-economy investment channel and through the trade balance.
- The trade balance effect occurs because lower interest rates cause a nominal depreciation (a real depreciation in the short run), which stimulates external demand.

We have now derived the shape of the IS curve, which describes goods and forex market equilibrium:

- *The IS curve is downward-sloping. It illustrates the negative relationship between the interest rate i and output Y.*

Factors That Shift the IS Curve

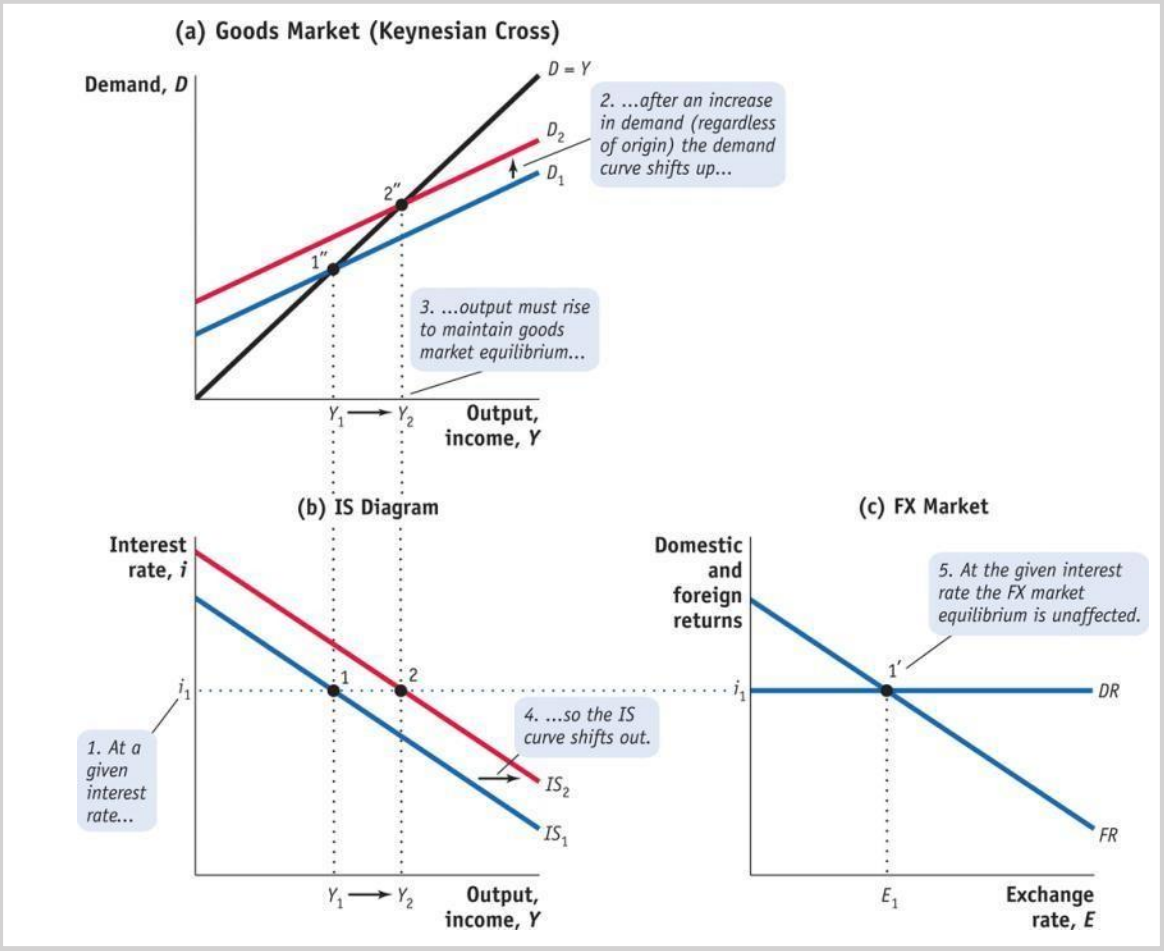
FIGURE 7-9 (1 of 2) Exogenous Shifts in Demand Cause the IS Curve to Shift



In the Keynesian cross in panel (a), when the interest rate is held constant at i_1, an exogenous increase in demand (due to other factors) causes the demand curve to shift up from D_1 to D_2 as shown, all else equal. This moves the equilibrium from 1″ to 2″, raising output from Y_1 to Y_2.

Factors That Shift the IS Curve

FIGURE 7-9 (2 of 2) Exogenous Shifts in Demand Cause the IS Curve to Shift (continued)



In the IS diagram in panel (b), output has risen, with no change in the interest rate.

The IS curve has therefore shifted right from IS_1 to IS_2.

The nominal interest rate and hence the exchange rate are unchanged in this example, as seen in panel (c).

Summing Up the IS Curve

$$IS = IS(G, T, i^*, E^e, P^*, P)$$

Factors That Shift the IS Curve

Rise in government spending G
Fall in taxes T
Rise in foreign interest rate i^*
Rise in future nominal exchange rate E^e
Rise in foreign prices P*
Fall in home prices P
Any shift up in the consumption function C
Any shift up in the investment function I
Any shift up in the trade balance function TB

$\Rightarrow$ Demand curve D shifts up (Increasing demand D at a given level of output Y and a given home interest rate i) $\Rightarrow$ IS curve shifts right (Increase in equilibrium output Y at a given home interest rate i)

These changes are for a given level of i.

The opposite changes lead to a decrease in demand and shift the

demand curve down and the IS curve to the left.

4 Money Market Equilibrium: Deriving the LM Curve

In this section, we derive a set of combinations of Y and i that ensures equilibrium in the money market, a concept that can be represented graphically as the **LM curve**.

Money Market Recap

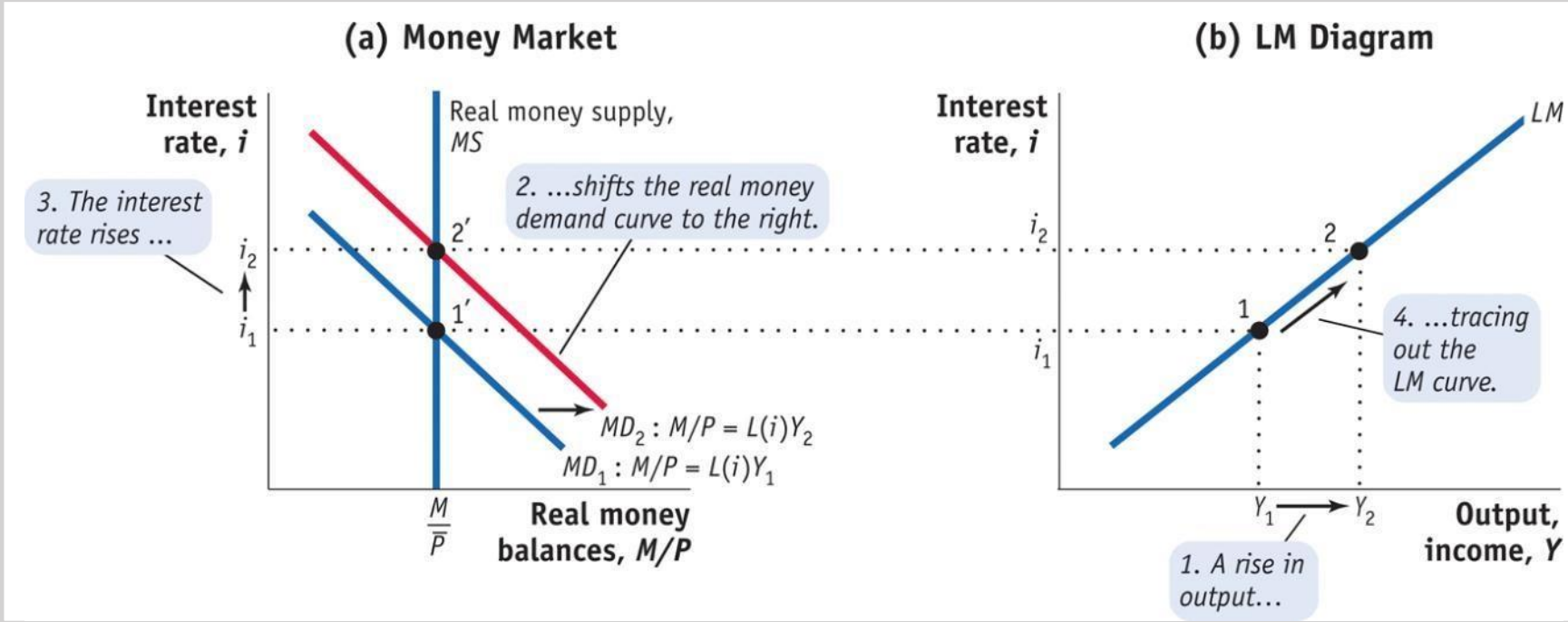
- In the short run, the price level is assumed to be sticky at a level $\bar{P}$, and the money market is in equilibrium when the demand for real money balances $L(i)Y$ equals the real money supply $M/\bar{P}$:

$$\underbrace{\frac{M}{\bar{P}}}_{\substack{\text{Real}\\ \text{money}\\ \text{supply}}} = \underbrace{L(i)\,Y}_{\substack{\text{Real}\\ \text{money}\\ \text{demand}}} \qquad (7\text{-}2)$$

4 Money Market Equilibrium: Deriving the LM Curve

Deriving the LM Curve

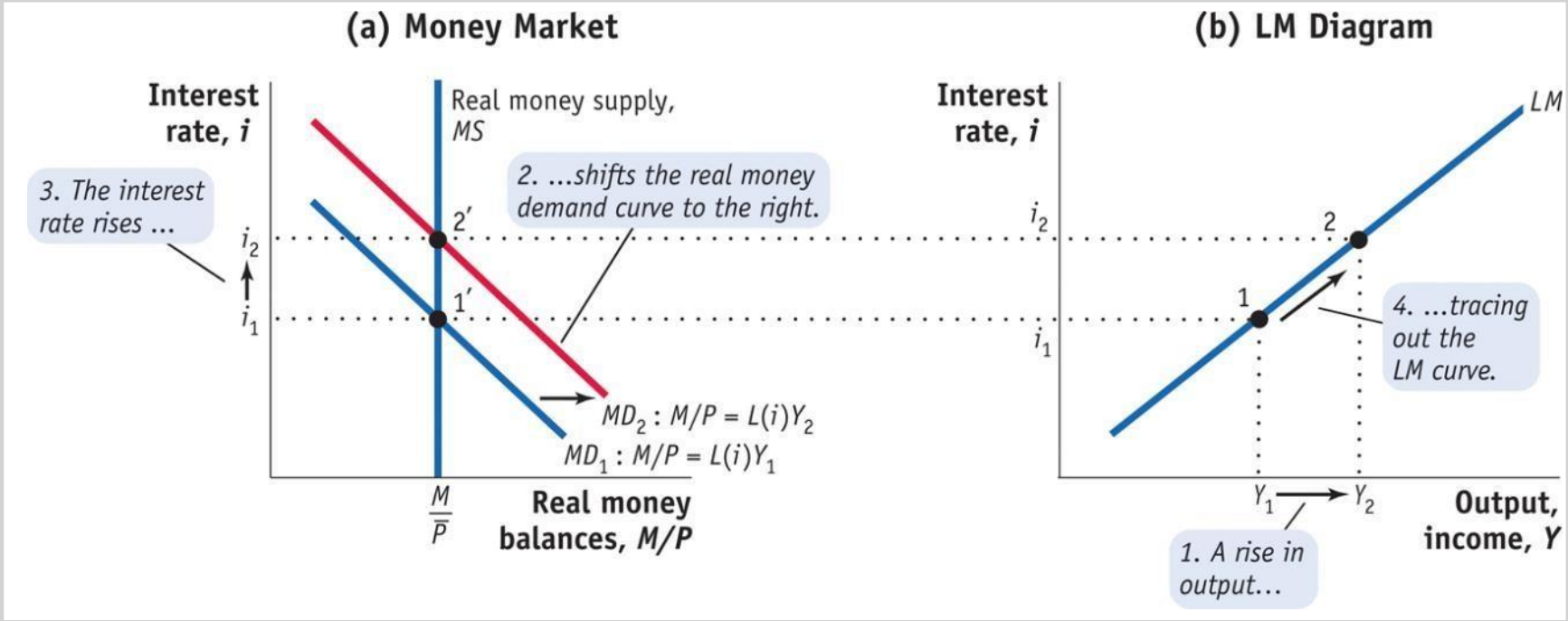
FIGURE 7-10 (1 of 2) Deriving the LM Curve



If there is an increase in real income or output from Y_1 to Y_2 in panel (b), the effect in the money market in panel (a) is to shift the demand for real money balances to the right, all else equal. If the real supply of money, MS, is held fixed at $M/\bar{P}$, then the interest rate rises from i_1 to i_2 and money market equilibrium moves from point 1′ to point 2′.

Deriving the LM Curve

FIGURE 7-10 (2 of 2) Deriving the LM Curve (continued)

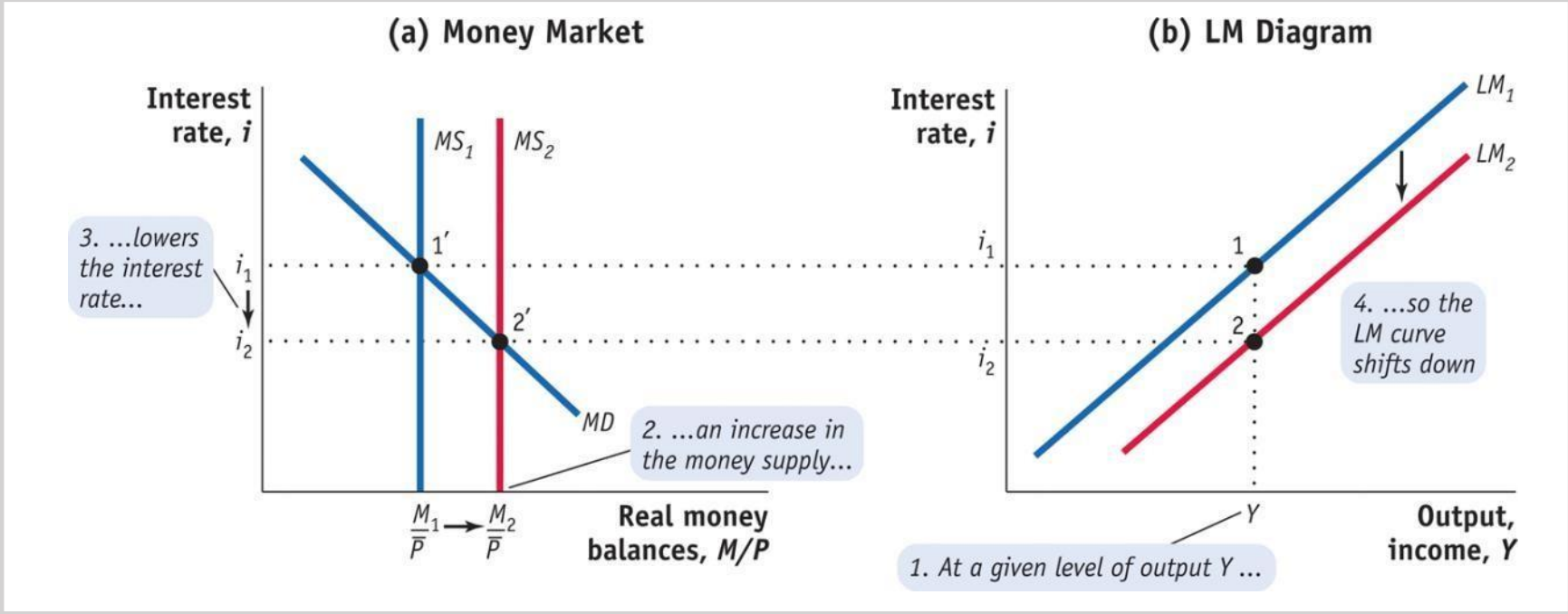


The relationship between the interest rate and income is known as the LM curve and is depicted in panel (b). The LM curve is upward-sloping: When the output level rises from Y_1 to Y_2, the interest rate rises from i_1 to i_2. The LM curve describes all combinations of i and Y that are consistent with money market equilibrium in panel (a).

4 Money Market Equilibrium: Deriving the LM Curve

Factors That Shift the LM Curve

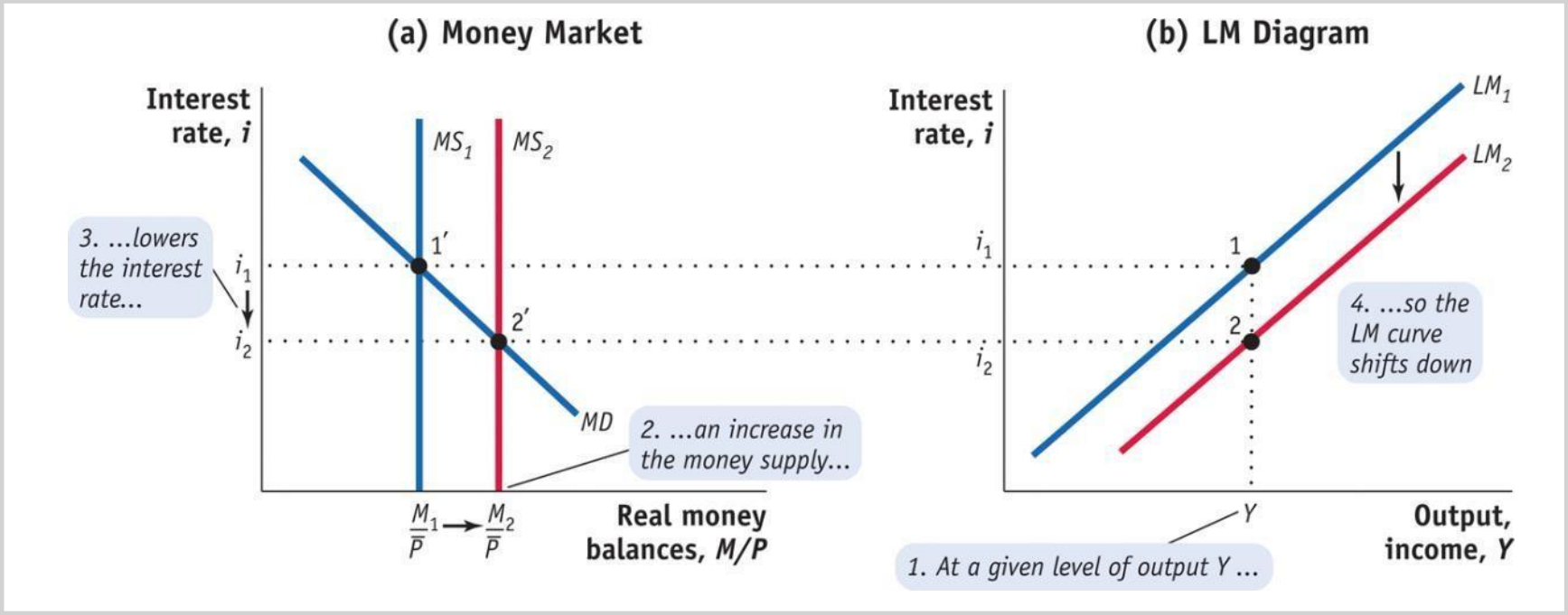
FIGURE 7-11 (1 of 2) Change in the Money Supply Shifts the LM Curve



In the money market, shown in panel (a), we hold fixed the level of real income or output, Y, and hence real money demand, MD. All else equal, we show the effect of an increase in money supply from M_1 to M_2. The real money supply curve moves out from MS_1 to MS_2. This moves the equilibrium from 1′ to 2′, lowering the interest rate from i_1 to i_2.

Factors That Shift the LM Curve

FIGURE 7-11 (2 of 2) Change in the Money Supply Shifts the LM Curve (continued)



In the LM diagram, shown in panel (b), the interest rate has fallen, with no change in the level of income or output, so the economy moves from point 1 to point 2.

The LM curve has therefore shifted down from LM_1 to LM_2.

4 Money Market Equilibrium: Deriving the LM Curve

Summing Up the LM Curve

$$LM = LM\left(M\mathrm{T}\overline{P}\right)$$

Factors That Shift the LM Curve

Rise in (nominal) money supply M

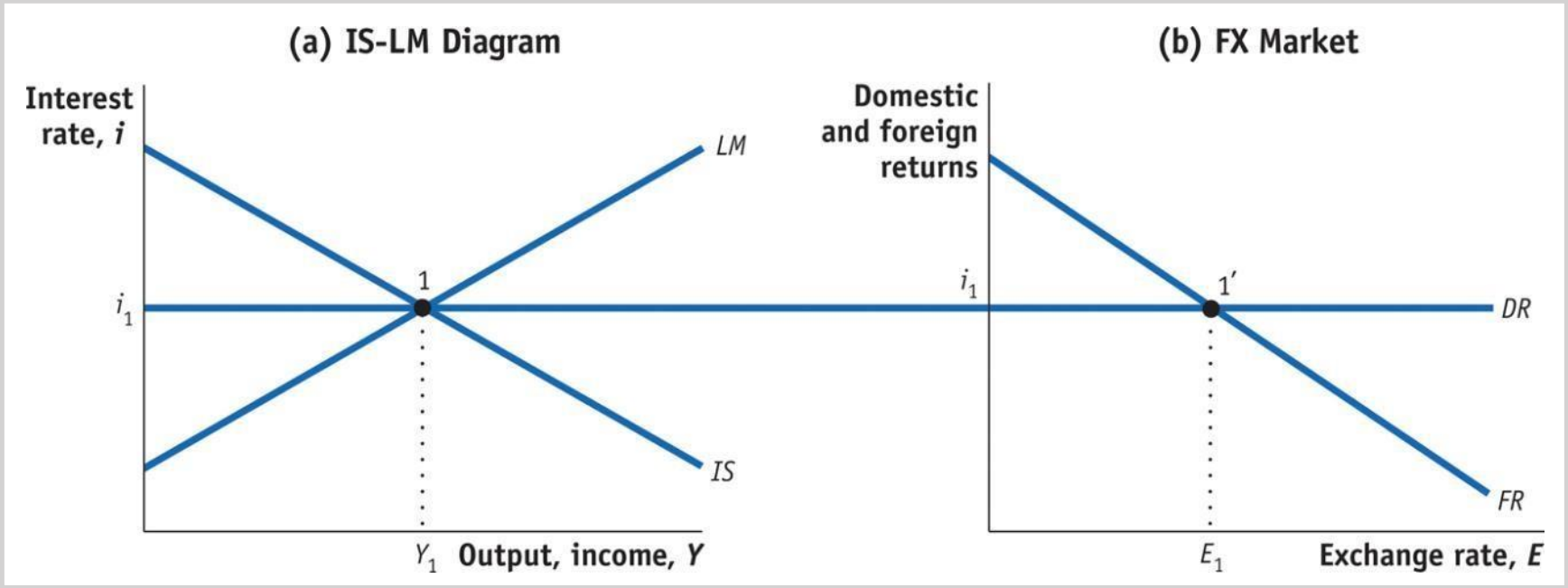
Any shift left in the money demand function L

$\Rightarrow$ LM curve shifts down or right

Decrease in equilibrium home interest rate i at given level of output Y

5 The Short-Run IS–LM–FX Model of an Open Economy

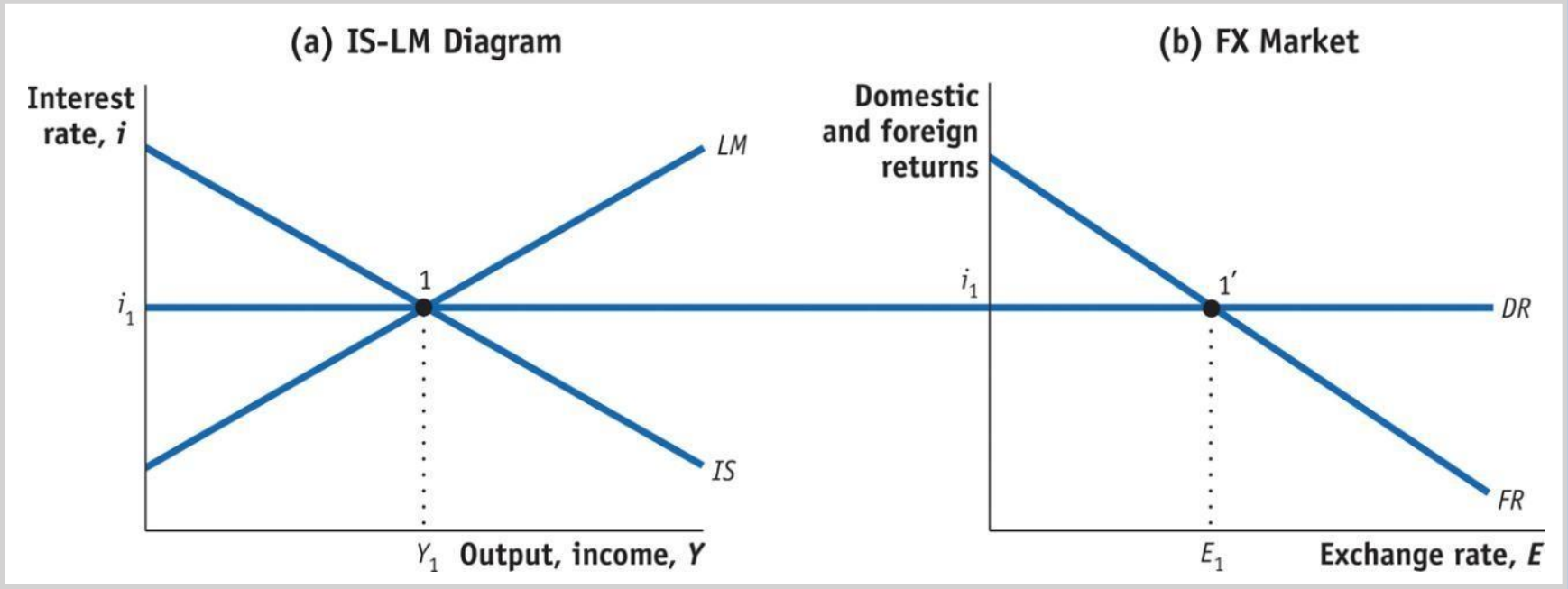
FIGURE 7-12 (1 of 2) Equilibrium in the IS–LM–FX Model



In panel (a), the IS and LM curves are both drawn. The goods and forex markets are in equilibrium when the economy is on the IS curve. The money market is in equilibrium when the economy is on the LM curve. Both markets are in equilibrium if and only if the economy is at point 1, the unique point of intersection of IS and LM.

5 The Short-Run IS–LM–FX Model of an Open Economy

FIGURE 7-12 (2 of 2) Equilibrium in the IS–LM–FX Model (continued)



In panel (b), the forex (FX) market is shown. The domestic return, *DR*, in the forex market equals the money market interest rate.

Equilibrium is at point 1′ where the foreign return *FR* equals domestic return, *i*.

CHAPTER 4

The Keynesian Short-Run Policy Model: Demand-Side Policies

Chapter Goals

- Discuss the key insight of the *AS*/*AD* model and list both its assumptions and its components.
- Describe the shape of the aggregate demand curve and what factors shift the curve.
- Explain the shape of the short-run and long-run aggregate supply curves and what factors shift the curves.
- Show the effects of shifts of the aggregate demand and aggregate supply curves on the price level and output in both the short run and long run.
- Discuss the limitations of the macro policy model.

The Keynesian *AS/AD* Model: Output

Short-run equilibrium output may differ from long-run potential output assuming a fixed price level.

- **Equilibrium output** is the level of output toward which the economy gravitates in the short run because of the cumulative cycles of declining or increasing production.
- **Potential output** is the highest amount of output an economy can sustainably produce using existing production processes and resources.

The Keynesian *AS/AD* Model: Policy

Keynesian model focuses on the use of monetary and fiscal policy.

- **Monetary policy** – a policy of influencing the economy through changes in the money supply and interest rates.
- **Fiscal policy** – the deliberate change in either government spending or taxes (or more generally the deficit) to stimulate or slow down the economy).

Key Insight of the Keynesian *AS/AD* Model

Paradox of thrift means an increase in saving may lead to a decrease in spending, output, causing a recession and lowering total saving.

Keynesians believe the economy would need government's help to prop up aggregate expenditures.

Keynesian economists advocated an activist demand management policy.

The Components of the *AS/AD* Model

Three important things about the *AS/AD* model:

1. It is a short-run model.
2. It is a pedagogical model.
3. It starts with aggregate relationships.

The *AS/AD* model does provide a simple model that suggest a role for government in keeping feedback effects from spiraling an economy downward.

The *AS/AD* Model Consists of Three Curves

1. **Aggregate Demand (*AD*) Curve:** a curve that shows how a change in the price level will change aggregate expenditures on all goods and services in an economy.

2. **Short-Run Aggregate Supply (*SAS*) Curve:** a curve that specifies how a shift in the aggregate demand curve affects the price level and real output in the short run, other things constant.

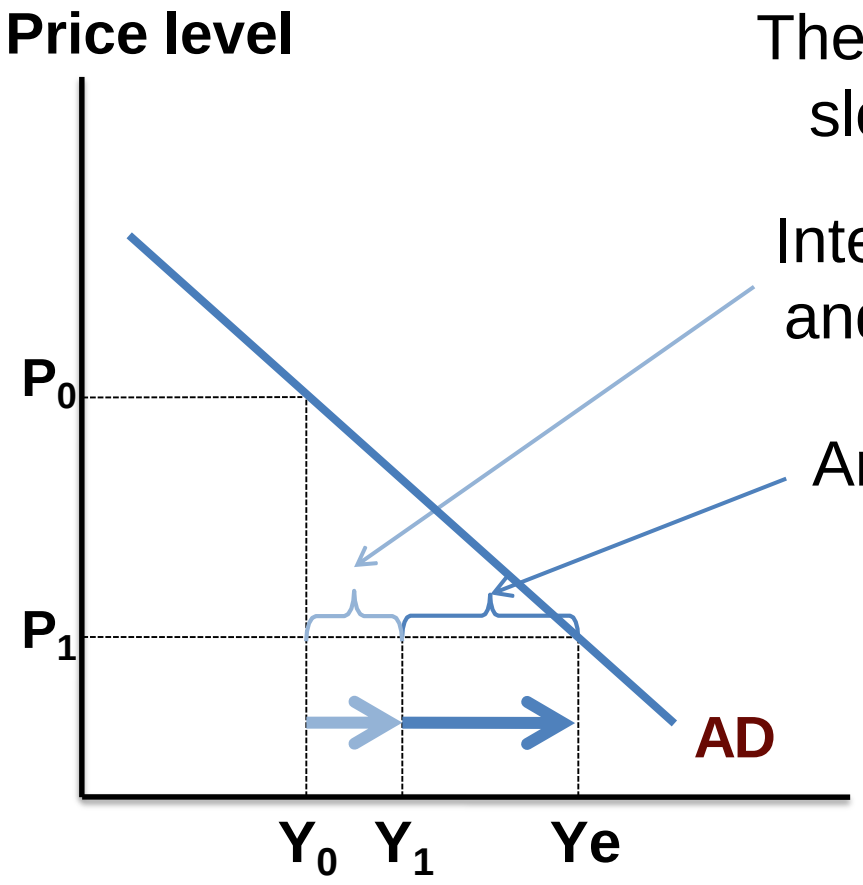
3. **Long-Run Aggregate Supply (*LAS*) Curve:** a curve that shows the long-run relationship between output and the price level.

The *AD* Curve Is Downward Sloping

Explanations that make the *AD* curve *downward* sloping:

- **Interest rate effect -** the effect that a lower price level has on investment expenditures through the effect that a change in the price level has on interest rates.
- **International effect -** as the price level falls (assuming the exchange rate does not change), net exports will rise.
- **Money wealth effect -** a fall in the price level will make the holders of money richer, so they buy more.
- **Multiplier effect -** the amplification of initial changes in expenditures.

The Slope of the *AD* Curve



The *AD* curve is *downward* sloping because of the:

Interest rate, international, and money wealth effects

And the multiplier effect

Dynamic Price-Level Adjustment Feedback Effects

Dynamic effects exist that can overwhelm the standard *AD* shift factors.

Especially important when aggregate demand is declining are:

- Expectations of falling aggregate demand
- Lower asset prices (declining nominal wealth)
- Financial panics

These forces counteract the standard shift factors.

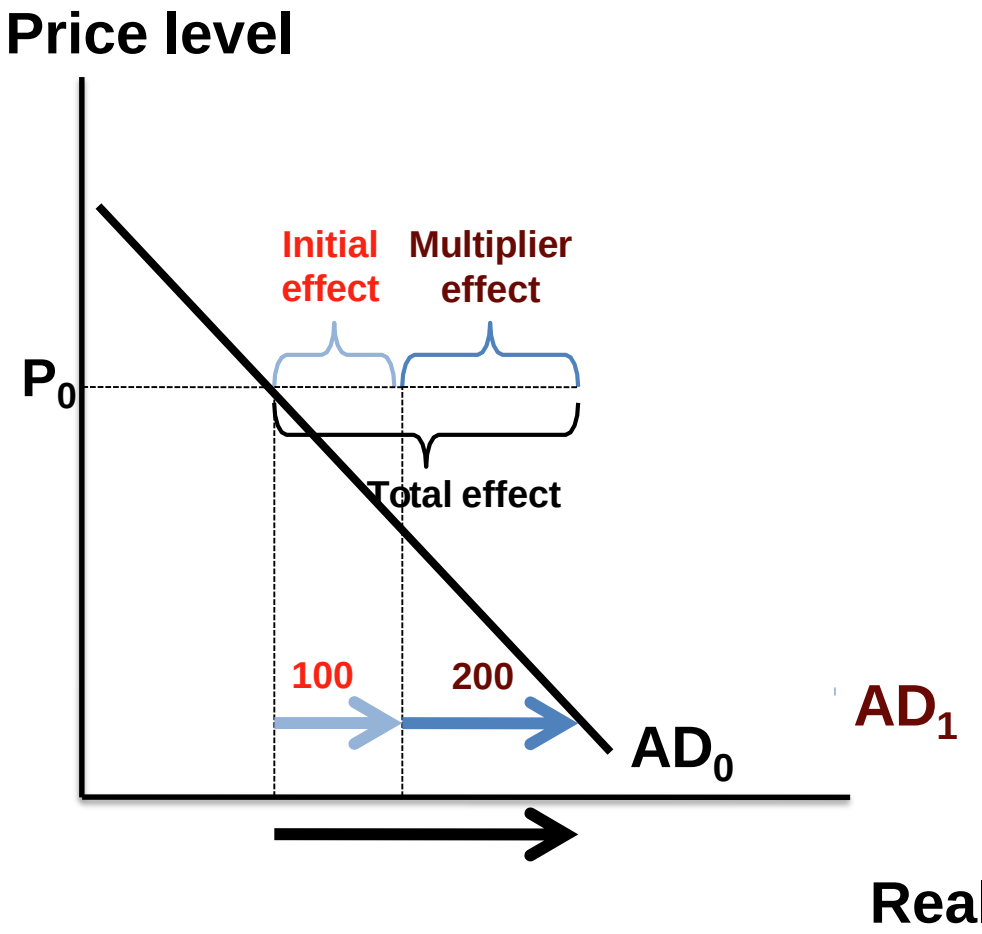
If strong enough, dynamic forces can cause aggregate demand to fall (shift to the left) when the price level falls.

Shifts in the *AD* Curve

A shift in the *AD* curve means that at every price level, total expenditures have changed. Five important shift factors are:

- Foreign income
- Exchange rate fluctuations
- Distribution of income
- Expectations
- Government policies

Shifts in the *AD* Curve



The AD curve shifts out by more than the initial change in expenditures:

- Exports increase by 100.
- The multiplier magnifies this shift.

AD curve shifts to the *right* by a multiple of 100, in this case by 300.

Shifts in the *AD* Curve

The Aggregate Supply Curves

The shape of the *SAS* curve reflects two different types of markets in our economy:

1. Auction markets: The markets represented by the supply/demand model. They are much more common in markets for resources such as oil or farm products.

2. Posted price markets: Also called **quantity-adjusting markets,** these are markets in which firms respond to changes in demand primarily by changing production instead of changing their prices. HOWEVER, firms tend to increase their markup when demand increases.

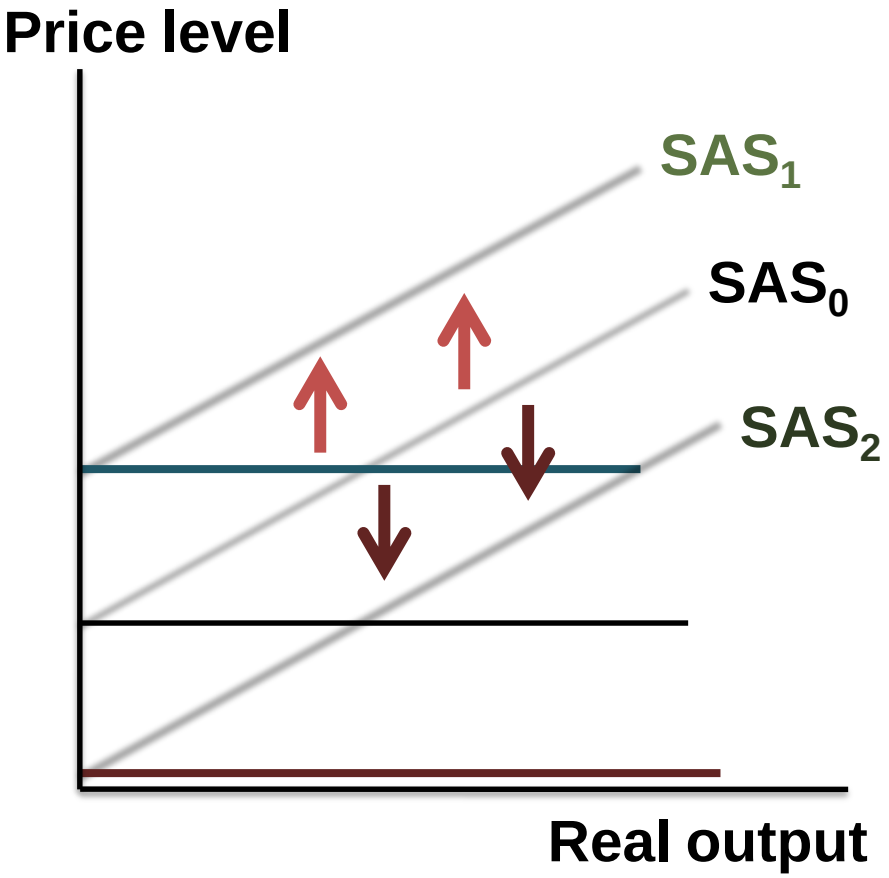
The Aggregate Supply Curves

The two reasons the *SAS* curve slopes upward are:

1. Upward-sloping supply curves in auction markets.

2. Firms' tendency to increase their markup when demand increases.

Shifts in the *SAS* Curve



Shifts in the *SAS* are caused by:

- Changes in Input prices
- Productivity
- Import prices
- Excise and sales taxes

When production costs increase, the *SAS* curve shifts up.

In general:

%Δ in price level =

%Δ in wages – %Δ in productivity

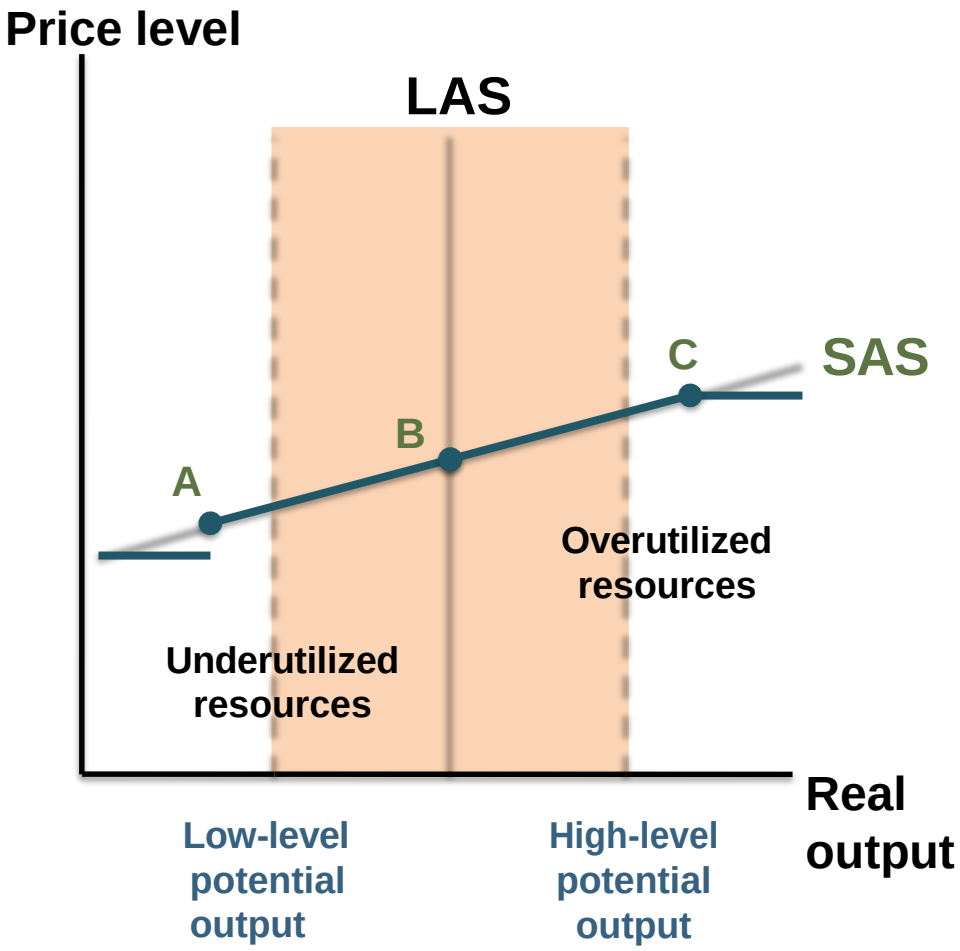
The Long-Run Aggregate Supply Curve

The long-run aggregate supply (*LAS*) curve shows the long-run relationship between output and the price level.

The position of the *LAS* curve depends on **potential output** which is the amount of goods and services an economy can produce when both capital and labor are employed at their maximum sustainable level.

The *LAS* curve is vertical because potential output is unaffected by the price level.

The *LAS* Curve

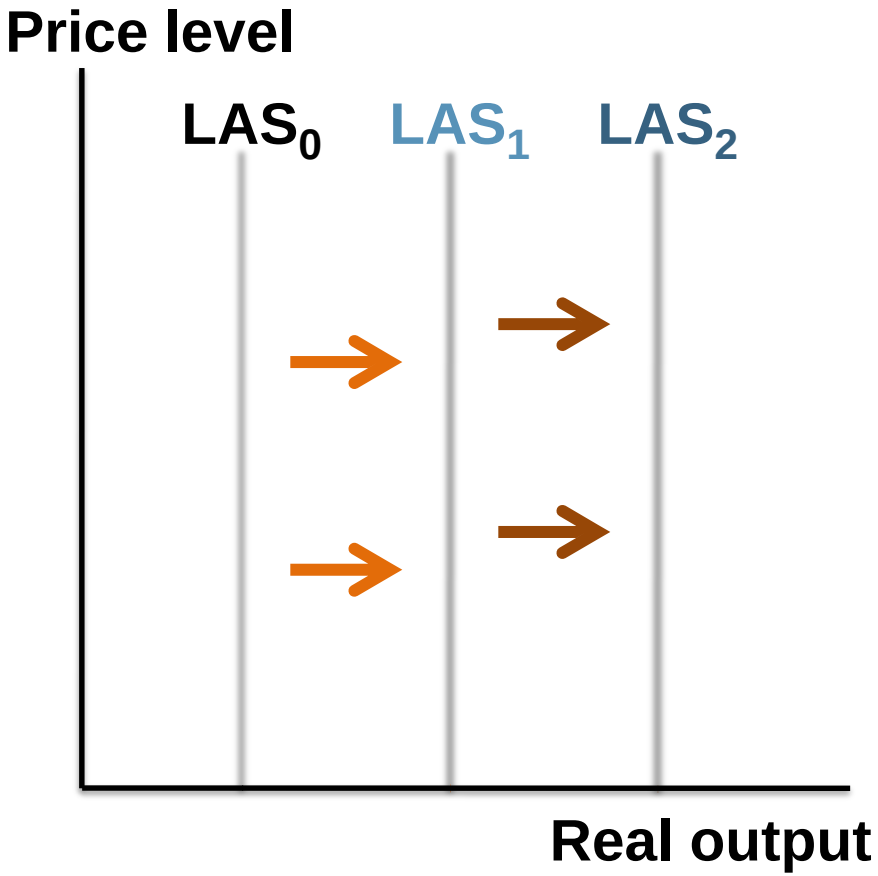


Potential output is assumed to be in the middle of a range bounded by high and low levels of potential output.

When resources are over-utilized (point C), factor prices may be bid up and the *SAS* shifts up.

When resources are under-utilized (point A), factor prices may decrease and *SAS* shifts down.

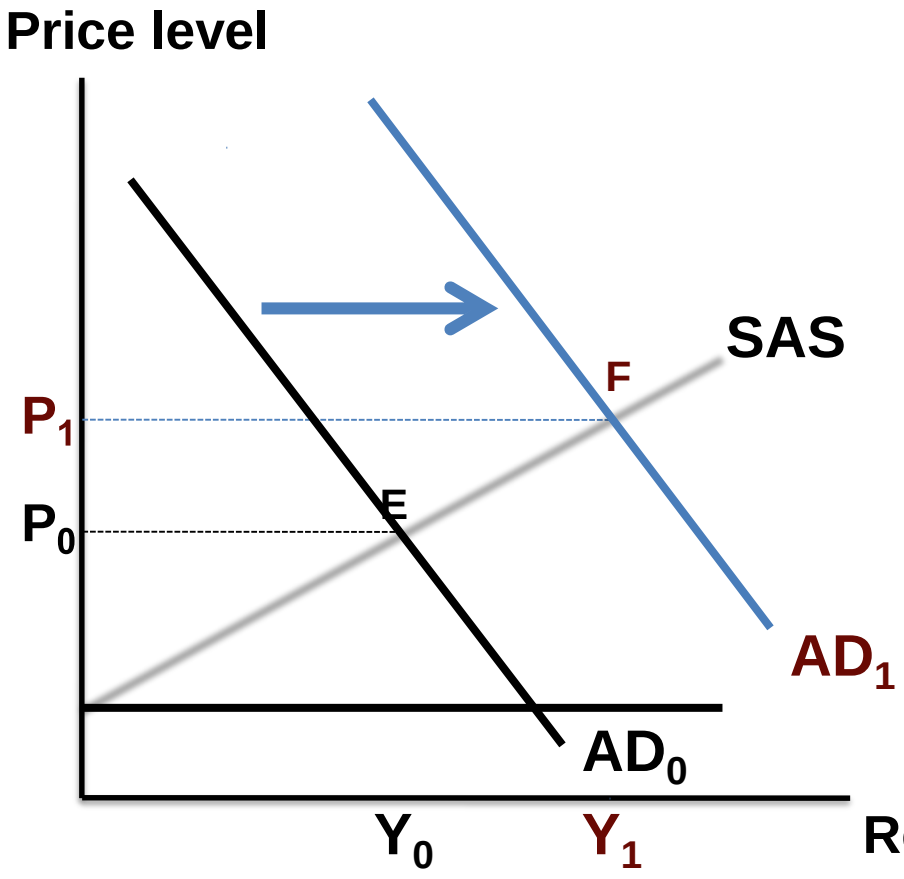
Shifts in the *LAS* Curve



Increases in the *LAS* are caused by increases in:

- Capital
- Available resources
- Growth-compatible institutions
- Technology
- Entrepreneurship

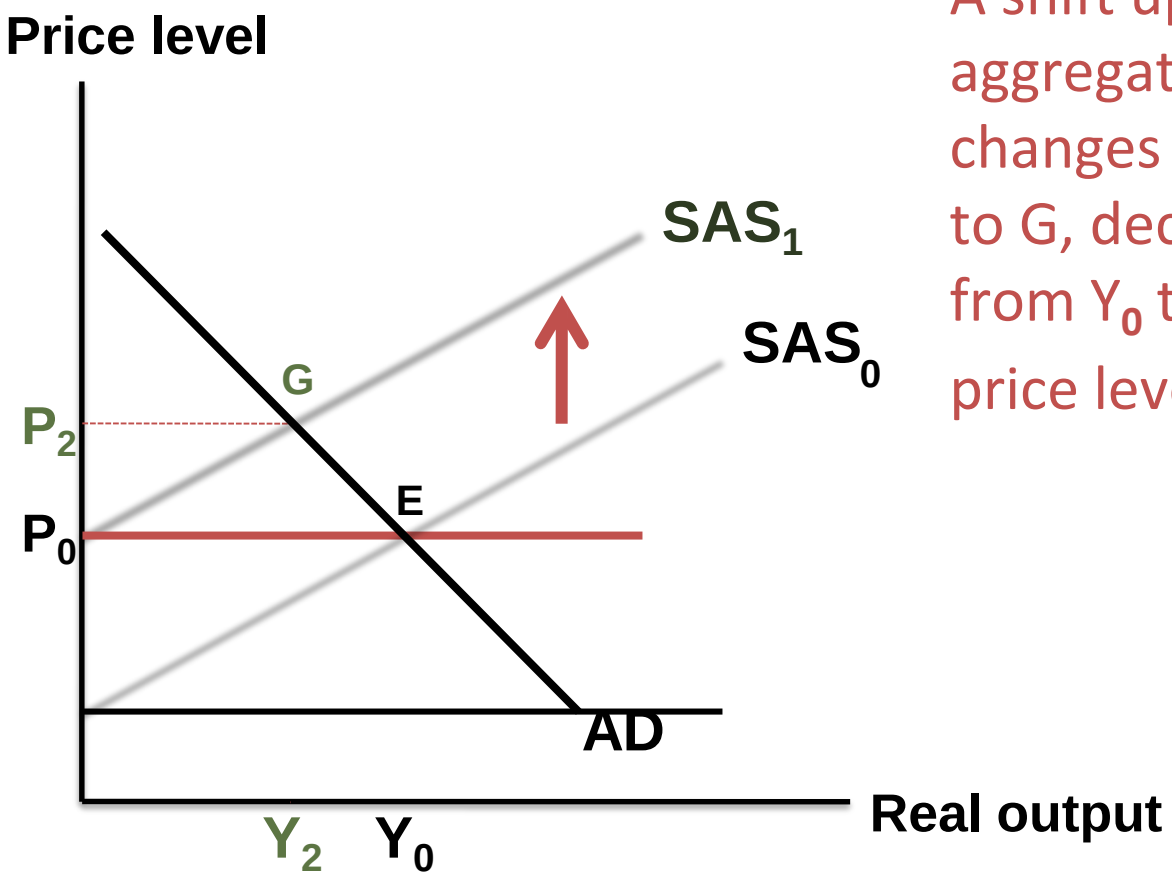
Short-Run Equilibrium in the *AD*/*AS* Model



Short-run equilibrium is where the *SAS* and *AD* curves intersect and point E is short-run equilibrium.

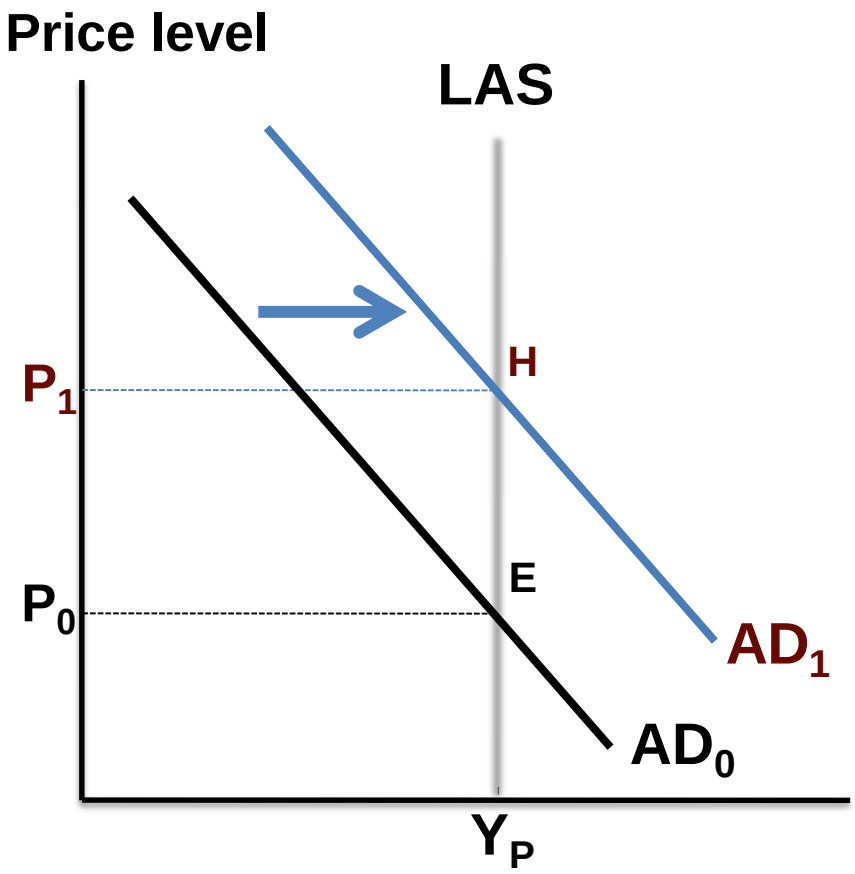
A shift in the aggregate demand curve to the right changes equilibrium from E to F, increasing output from Y_0 to Y_1 and increasing price level from P_0 to P_1.

Short-Run Equilibrium in the *AD*/*AS* Model



A shift up in the short-run aggregate supply curve changes equilibrium from E to G, decreasing output from Y_0 to Y_2 and increasing price level from P_0 to P_2.

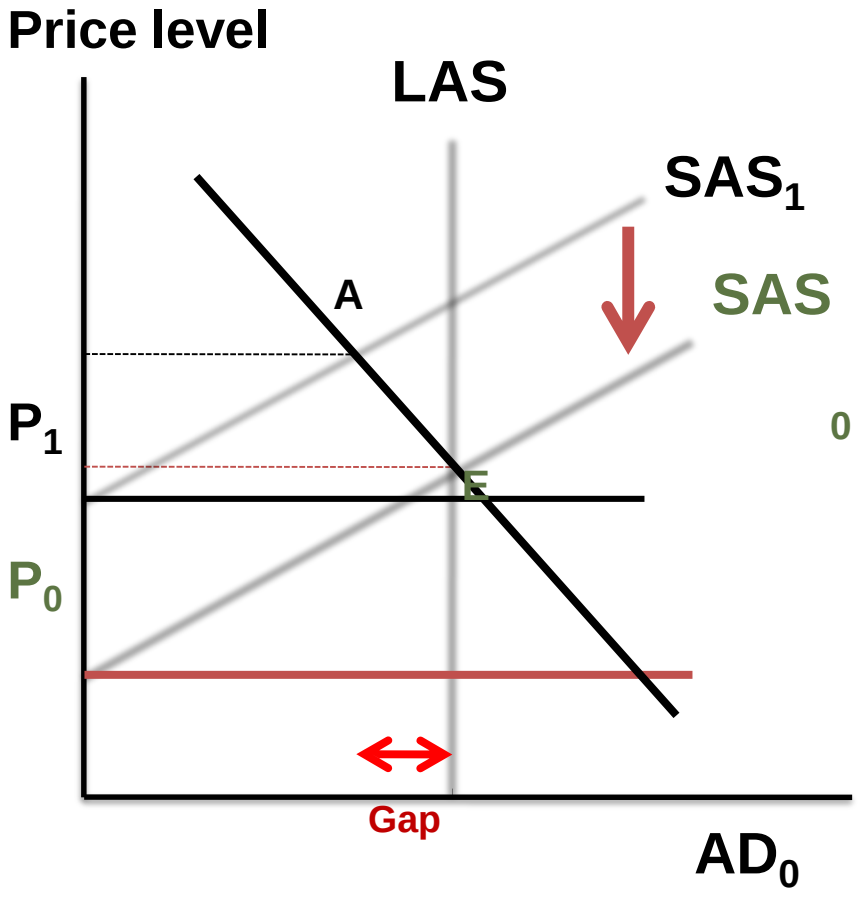
Long-Run Equilibrium in the *AD/AS* Model



Long-run equilibrium is where the LAS and AD curves intersect.

A shift in the aggregate demand curve changes equilibrium from E to H, increasing the price level from P_0 to P_1 but leaving output unchanged.

Application: A Recessionary Gap in the *AD/AS* Model



A **recessionary gap** is the amount by which equilibrium output is below potential output.

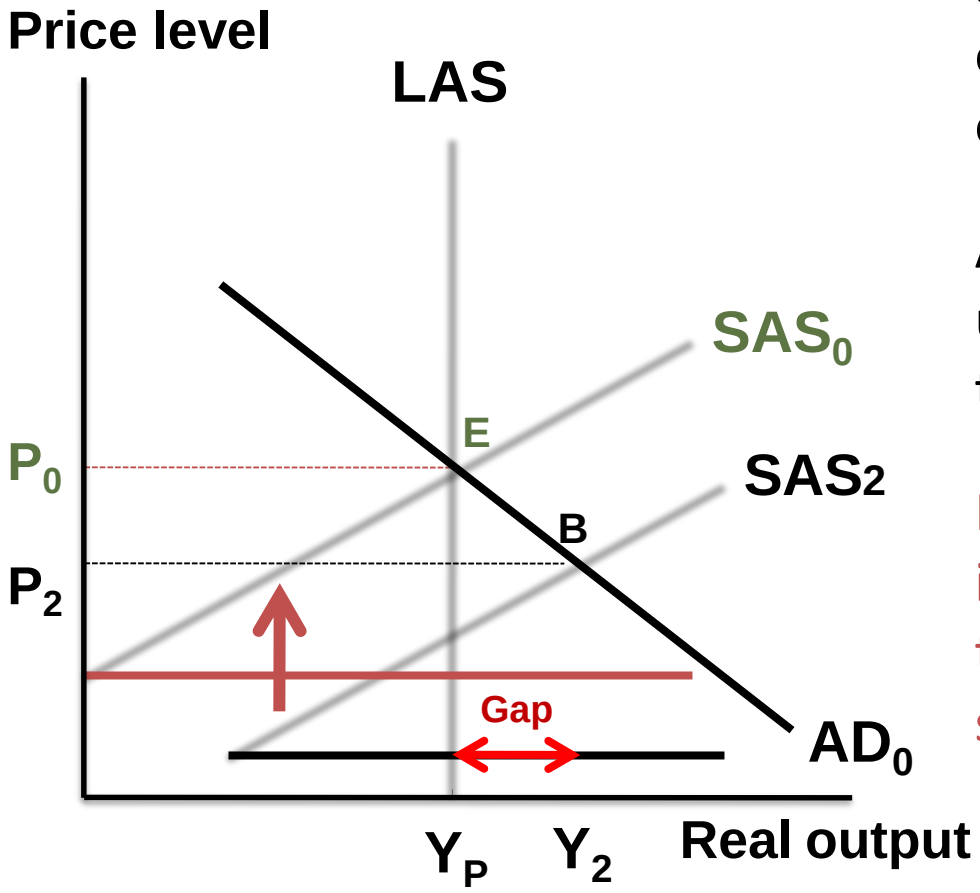
At point A, some resources are unemployed and the

recessionary gap is $Y_P - Y_1$.

Eventually wages and prices decrease and *SAS* shifts down to return the economy to a long and short-run equilibrium at E.

Y_1 Y_P **Real output**

Application: An Inflationary Gap in the *AD*/*AS* Model



An **inflationary gap** is the amount by which equilibrium output is above potential output.

At point B, resources are being used beyond their potential and the inflationary gap is $Y_2 - Y_P$.

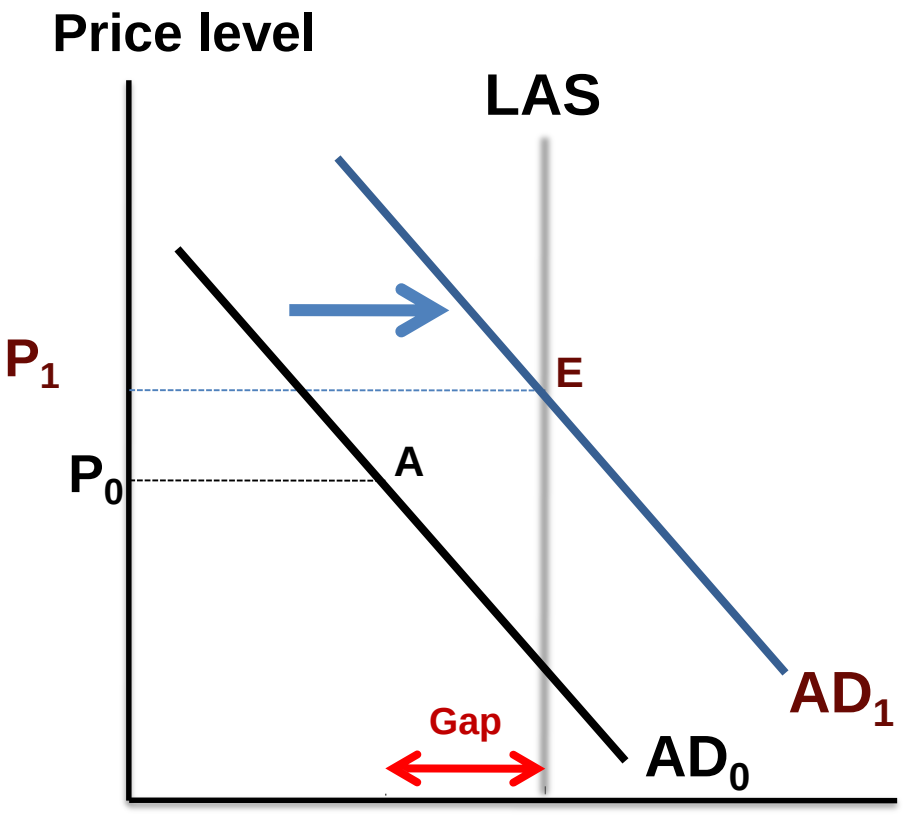
Eventually wages and prices increase and *SAS* shifts to return the economy to a long and short-run equilibrium at E.

Aggregate Demand Policy

A primary reason for government policy makers' interest in the AS/AD model is that monetary or fiscal policy shifts the AD curve.

- **Monetary policy** involves the Federal Reserve Bank changing the money supply and interest rates.
- **Fiscal policy** is the deliberate change in either government spending or taxes to stimulate or slow down the economy.

Application: Expansionary Fiscal Policy in the *AD*/*AS* Model

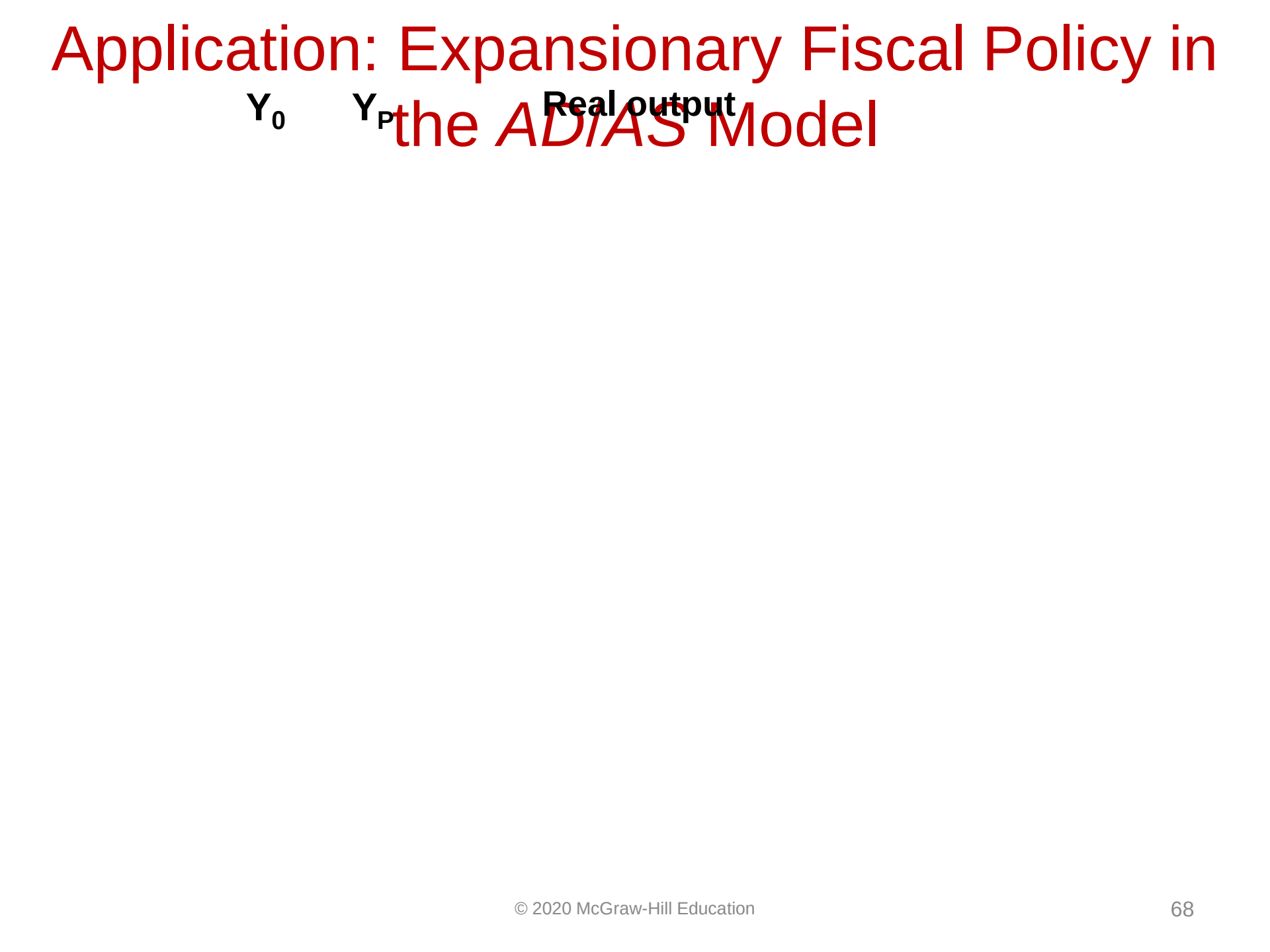


If the economy is at point A, there is a recessionary gap equal to $Y_P - Y_0$.

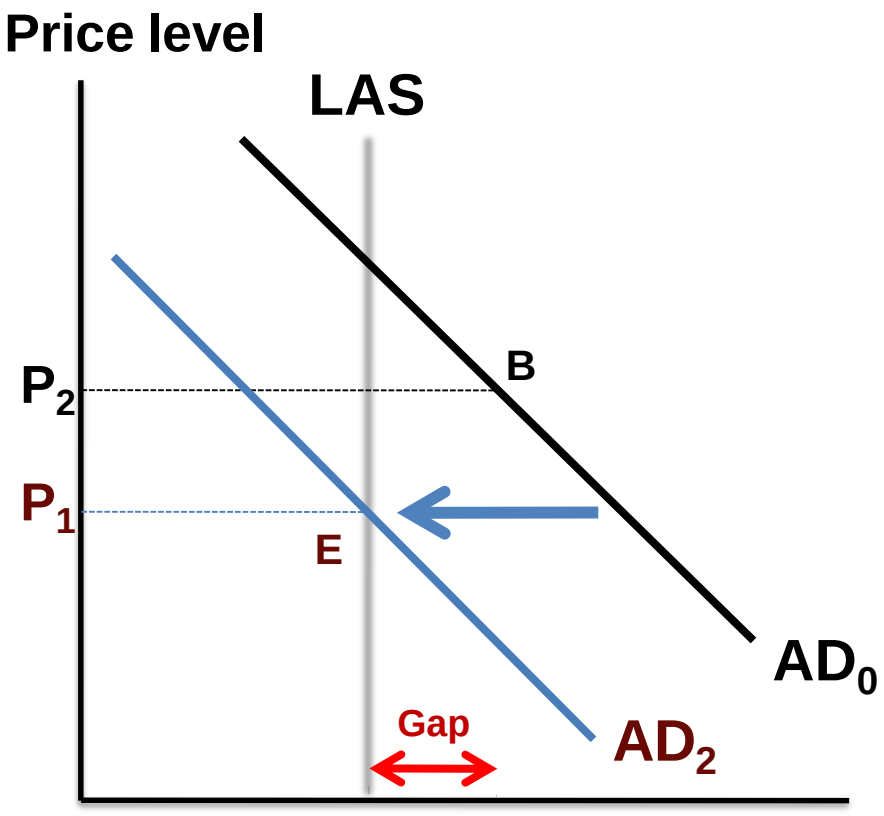
The appropriate fiscal policy is to increase government spending and/or decrease taxes.

AD shifts to the right and output returns to potential output Y_P and prices increase to P_1.

Application: Expansionary Fiscal Policy in the *AD/AS* Model



Application: Contractionary Fiscal Policy in the *AD*/*AS* Model



If the economy is point B, there is an inflationary gap $Y_2 - Y_P$.

The appropriate fiscal policy is to decrease government spending and/or increase taxes.

AD shifts to the left, output returns to potential output Y_P and inflation is prevented.

Application: Contractionary Fiscal Policy in the *AD/AS* Model

Limitations of the *AS*/*AD* Model

- The *AS*/*AD* model assumes away many possible feedback effects that can significantly affect the macroeconomy and lead to quite different conclusions.
- Implementing fiscal policy through changing taxes and government spending is a slow legislative process.
- There is no guarantee that government will do what economists say is necessary.

Limitations of the *AS*/*AD* Model

- Potential output (the level of output that the economy is capable of producing without generating inflation) is difficult to estimate.
- We do have ways to get a rough idea of where it is.
- There are many other possible interrelationships in the economy that the model does not take into account.
- The aggregate economy can become dynamically unstable, so a shock can set in motion changes that will not automatically be self-correcting.

Limitations of the *AS*/*AD* Model

There are two ways to think about the effectiveness of fiscal policy: in the model and in reality.

The effectiveness of fiscal policy depends on the government's ability to perceive and to react appropriately to a problem.

Countercyclical fiscal policy is fiscal policy in which the government offsets any change in aggregate expenditures that would create a business cycle.

Fine-tuning is used to describe such fiscal policy designed to keep the economy always at its target or potential level of income.

Chapter Summary (74 of

The key idea of the Keynesian *AS*/*AD* model is that in the short run the economy can deviate from potential output.

The *AS*/*AD* model consists of the aggregate demand curve, and the short-run aggregate supply curve, and the long-run aggregate supply curve.

The aggregate demand curve slopes downward because of the interest rate effect, the international effect, the money wealth effect, and the multiplier effect.

The short-run aggregate supply (*SAS*) curve is upward- sloping because, while for the most part firms in the United States adjust production to meet demand instead of changing price, some firms will raise prices when demand increases.

Chapter Summary (75 of

The long-run aggregate supply (*LAS*) curve is vertical at potential output.

The *LAS* curve shifts out when available resources, capital, labor, technology, and/or growth-compatible institutions increase.

Short-run equilibrium is where the *SAS* and *AD* curves intersect; Long-run equilibrium is where the *AD* and *LAS* curves intersect

Aggregate demand management policy attempts to influence the level of output in the economy

Chapter Summary (76 of

Fiscal policy works by providing a deliberate countershock to offset unexpected shocks to the economy.

Macroeconomic policy is difficult to conduct because:

- Implementing fiscal policy is a slow process.
- We don't really know where potential output is.
- There are interrelationships not included in the model.
- The economy can become dynamically unstable.

We must estimate potential output by looking at past levels of potential output and by looking at where the price level begins to rise.

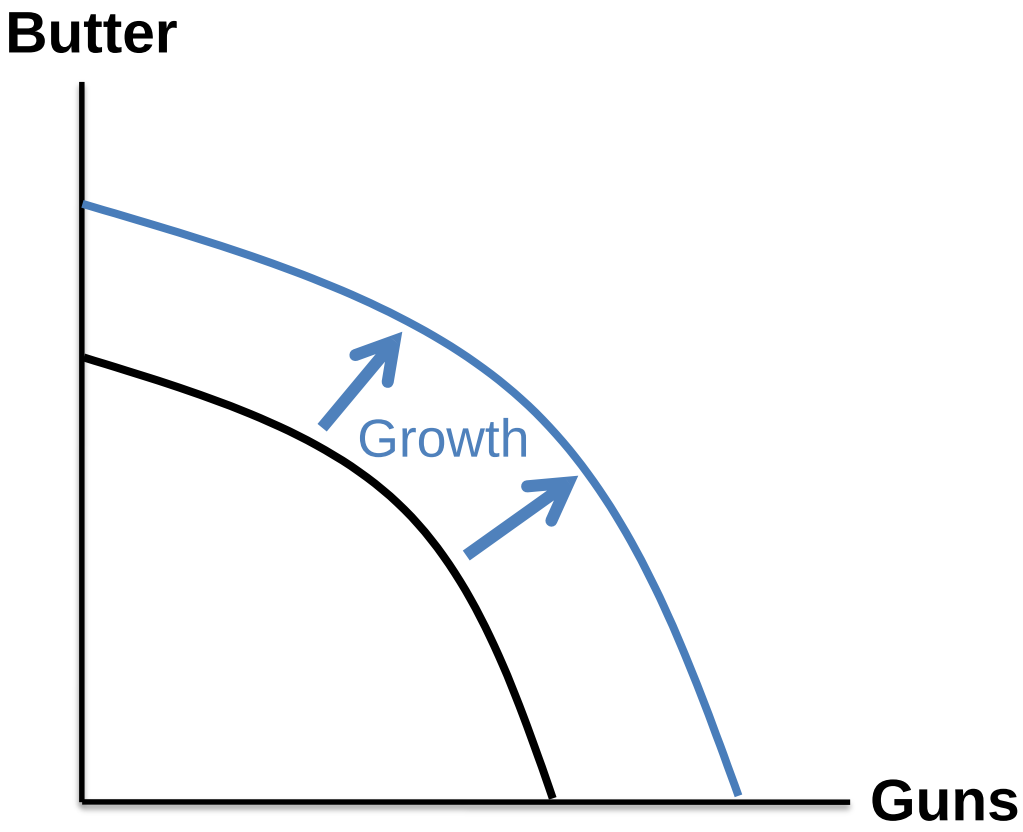
CHAPTER 5

The Classical Long-Run Policy Model: Growth and Supply-Side Policies

Chapter Goals

- Define growth, list its benefits and costs, and relate it to living standards.
- Discuss the relationship among markets, specialization, and growth.
- List five important sources of growth.
- Explain how the sources of growth can be turned into growth.

Production Possibility Curves



The analysis of growth focuses on forces that shift out the production possibility curve.

Growth and the Economy's Potential Output

Growth is an increase in potential output.

Potential output is the highest amount of output an economy can produce from existing production processes and resources.

- At potential output, an economy is operating on its production possibility curve.
- When below its potential output, an economy is operating inside its production possibility curve.
- Growth focuses on shifting out the production possibility curve.

Growth and the Economy's Potential Output

Productivity is output per unit of input.

The long-run growth focuses on supply; it assumes demand is sufficient to buy whatever is supplied.

Say's Law - supply creates its own demand.

The short-run focus is on how to get the economy operating at its potential.

The Benefits and Costs of Growth

Benefits of economic growth:

- Allows everyone in society, on average, to have more

Politically, growth (or predictions or growth) allows governments to avoid hard distributional questions.

Costs of economic growth:

- Pollution
- Resource exhaustion
- Destruction of natural habitat

Markets, Specialization, and Growth

Markets, specialization, and the division of labor increase productivity and growth.

- **Specialization** is the concentration of individuals on certain aspects of production.
- **Division of labor** is the splitting up of a task to allow for specialization of production.

Markets may seem unfair because of the effect that they have on the distribution of income.

Economic Growth, Distribution, and Markets

Even though growth isn't evenly distributed, it generally raises the incomes of the poor.

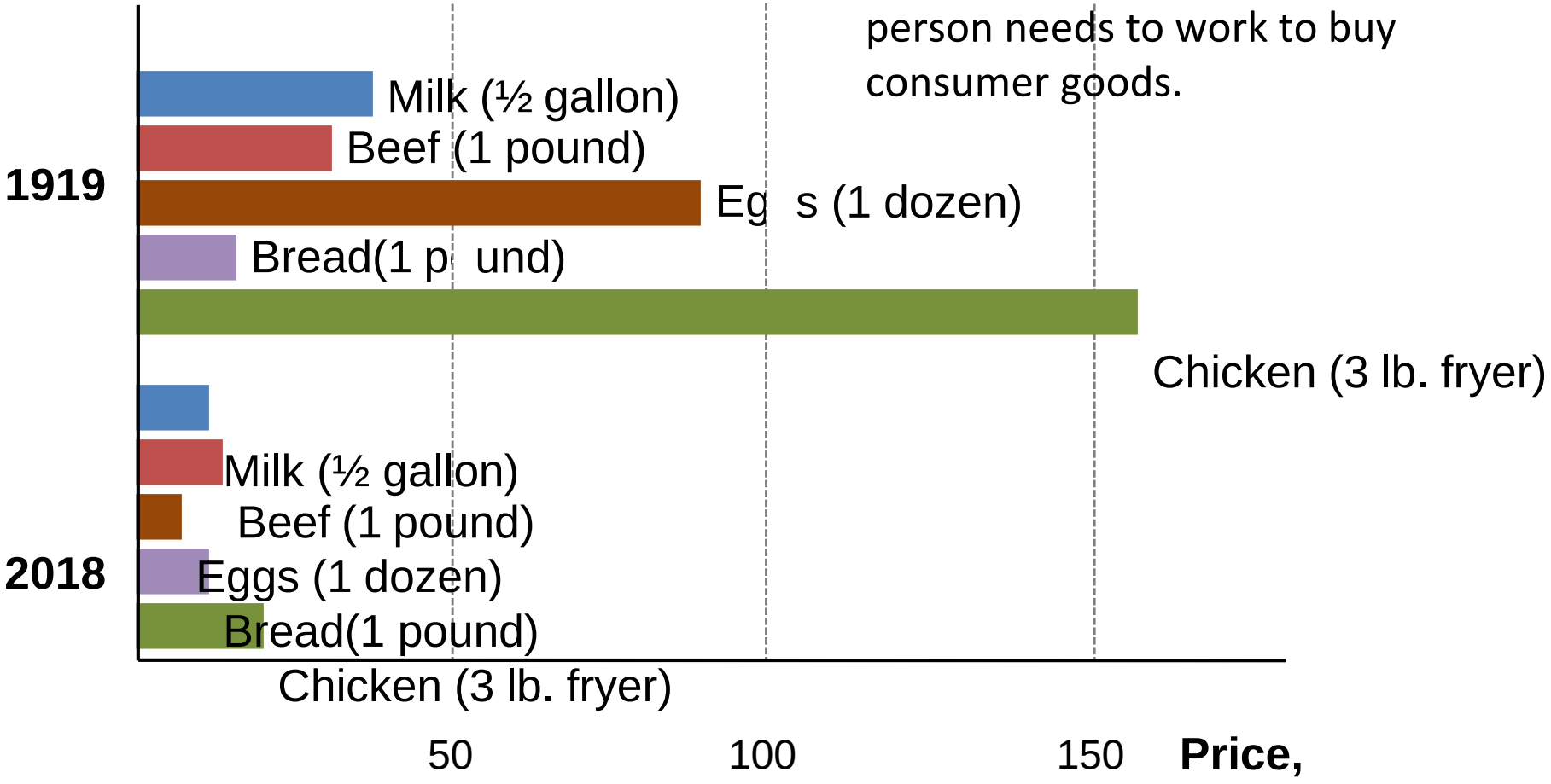
Today, the U.S. poverty level of a family of four is about $25,300.

If we go back 100 years ago in U.S. history, and adjust for inflation, that $25,300 income would put a family in the upper middle class.

Markets and growth had made that possible.

Cost of Goods in Hours of Work

Growth in the U.S. economy in the past century has reduced the number of hours the average person needs to work to buy consumer goods.



in minutes of work

Per Capita Growth

- Per capita output is total output divided by total population.
- **Per capita growth** means the country is producing more goods and services per person.

  Per capita growth = **%** change in output **–** **%** change in population

- Some suggest that median income is a better measure because it takes into account how income is distributed.

The Sources of Growth

Economists identify five important sources of growth:

1. Growth-compatible institutions
2. Investment and accumulated capital
3. Available resources
4. Technological development
5. Entrepreneurship

Growth-Compatible Institutions

- Markets and private ownership of property foster economic growth.
- When individuals get much of the gains of growth themselves, they work harder.
- Corporations are growth-compatible institutions because of limited liability, which gives stockholders an incentive to invest their savings in large enterprises.
- Informal property rights limit borrowing by the poor, and hence limit growth.

Investment and Accumulated Capital

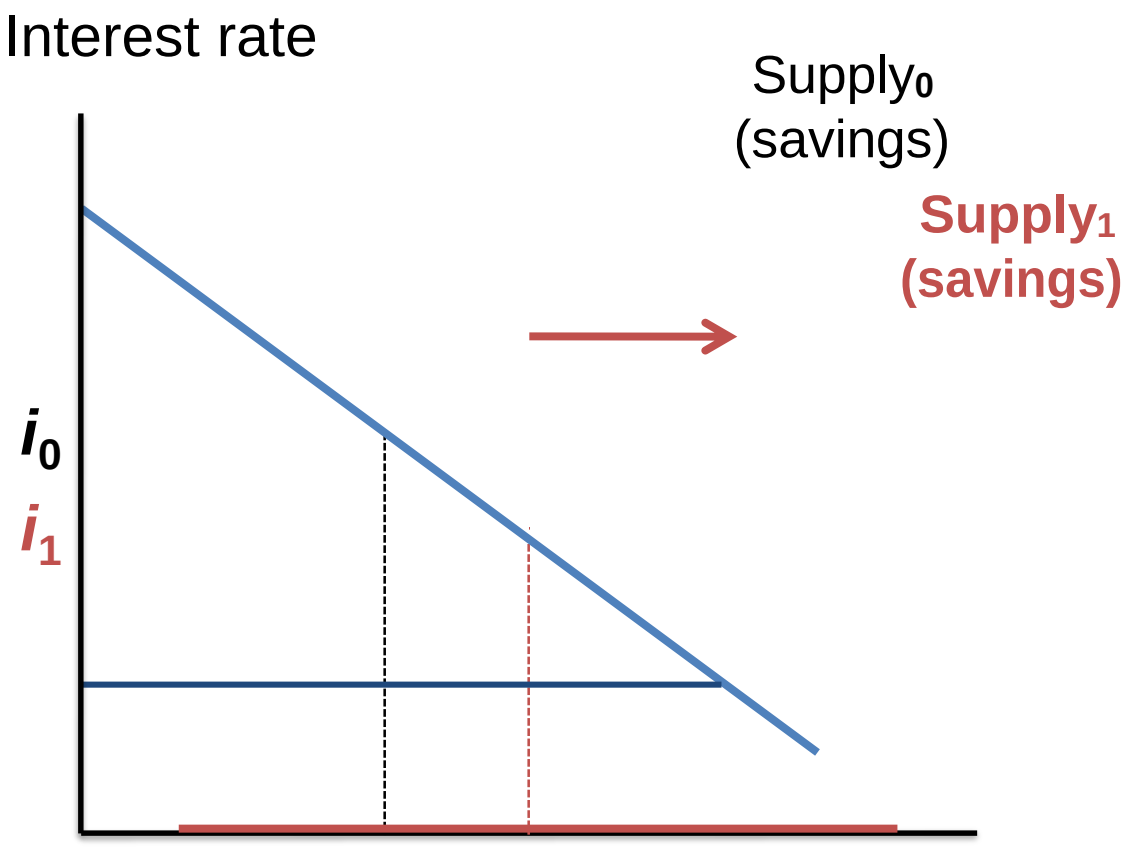
Although capital is a key element in growth, capital accumulation does not necessarily lead to growth.

Capital may become obsolete.

Capital is much more than physical machines and includes:

- **Human capital** are skills that workers gain from experience, education, and on-the-job training
- **Social capital** is the habitual way of doing things that guides people in how they approach production

The Loanable Funds Market



When the supply of loanable funds (savings) increases, the interest rate falls and the quantity of loanable funds demanded (investment) increases.

I_0 I_1

Demand (investment)

loanable funds

Q of

Available Resources

The growth in the U.S. in the 20th century was due in part to its large supply of natural resources.

What is a resource depends on the production processes of an economy and technology.

Greater participation in the market is another means by which to increase available resources.

Available Resources

New technology can overcome a lack of resources.

New options being explored:

- Geothermal energy
- Algae-produced fuel
- Wind power
- Plug-in cars
- Fuel cells
- Sugarcane-based ethanol
- Nuclear

Technological Development

Technology is the way we make goods and supply services.

- Changes in technology and changes in the goods and services we buy fuel growth.
- Advances in technology shift the production possibility curve *outward* by making workers more productive.
- Important developments in biotechnology, computers, and communications have helped fuel U.S. growth.

Entrepreneurship

Entrepreneurship is the ability to get things done using creativity, vision, willingness to accept risk, and a talent for translating vision into reality.

Examples of American entrepreneurs include:

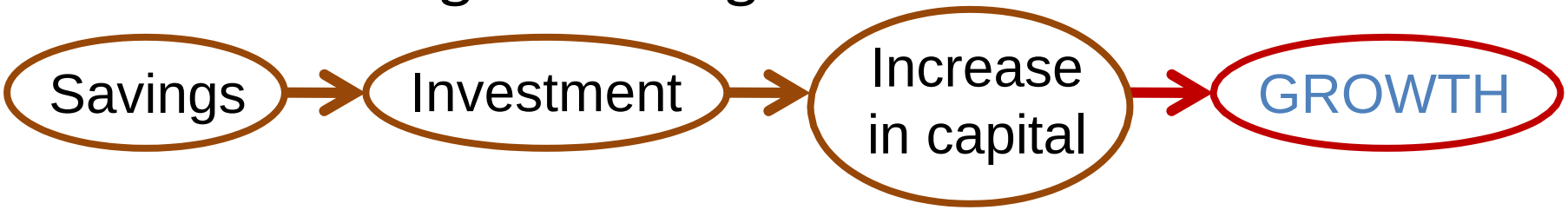
- Thomas Edison – generation and use of electricity
- Henry Ford – automobile production
- Bill Gates – computers and software
- Mark Zuckerberg – Facebook
- Jeff Bezos – Amazon

The Classical Growth Model

The Classical growth model is a theory of growth that focuses on the role of capital in the growth process.

According to the Classical growth model, the more capital an economy has, the faster it will grow.

Classical economists focused their analysis and their policy advice on how to increase investment because saving leads to growth.



The Law of Diminishing Marginal Productivity

Law of diminishing marginal productivity states that as more and more of a variable input is added to an existing fixed input, eventually the additional output produced with that additional input falls.

The predictions for the long term were incorrect because increases in technology and capital overwhelmed diminishing marginal productivity.

The focus changed to technology, not land or capital.

Without growth in technology, investment will not generate sustained growth. Eventually the per capita growth would stagnate.

Technology

Technological advance is the result of what the economy does.

- Invests in research and development
- Makes advances in pure science
- Works out new ways to organize production

The common knowledge aspect of technology creates positive externalities which is the key to growth.

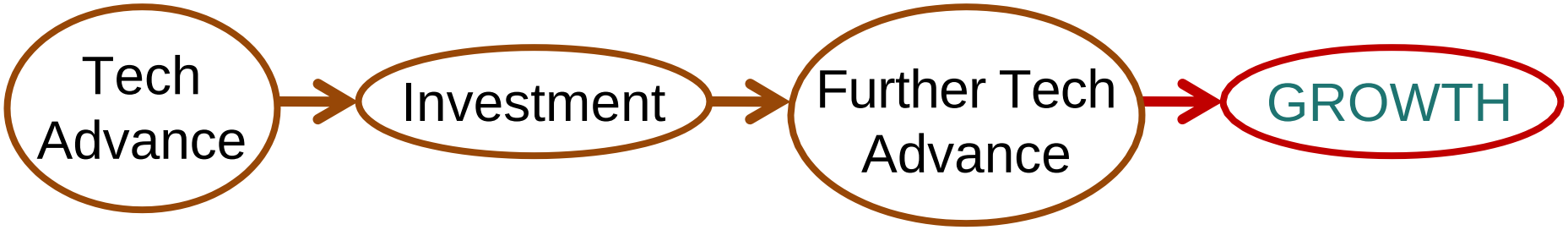
- **Positive externalities** are positive effects on others not taken into account by the decision maker.

New Growth Theory

New growth theory is a theory that emphasizes the role of technology in the growth process.

Technology is recognized as an important ingredient in growth.

Modern growth theory is named new growth theory.



Growth Policies

General policies that are good for growth include:

- Encouraging saving and investment
- Formalizing property rights and reducing bureaucracy and corruption
- Providing more of the right kind of education
- Promoting policies that encourage technological innovation
- Promoting policies that allow taking advantage of specialization

Chapter Summary (96 of

Growth is an increase in the amount of goods and services an economy can produce when both labor and capital are fully employed.

Growth increases potential output and shifts the production possibility curve out, allowing an economy to produce more goods.

Markets allow specialization and division of labor, which increases productivity and leads to growth.

Per capita growth means producing more goods and services per person. It can be calculated by subtracting the percentage change in the population from the percentage change in output.

Chapter Summary (97 of

Five sources of growth are (1) growth-compatible institutions (2) capital accumulation (3) available resources (4) technological development and (5) entrepreneurship.

The loanable funds market translates saving into investment that is necessary for growth and the interest rate equilibrates saving and investment.

The Classical growth model focuses on the role of capital accumulation in the growth process. The law of diminishing productivity limits growth of per capita income.

Chapter Summary (3 of 3)

New growth theory emphasizes the role of technology in the growth process.

Advances in technology have overwhelmed the effects of diminishing marginal productivity.

Policies that are good for growth are those that: (1) encourage saving and investment, (2) formalize property rights, (3) provide the right kind of education, (4) encourage technological innovation, and (5) take advantage of specialization.

CHAPTER 6

The Fiscal Policy Dilemma

Chapter Goals

- Summarize the Classical view of sound finance.
- Summarize the Keynesian view of functional finance.
- List six assumptions of the *AS/AD* model that lead to potential problems with the use of fiscal policy.
- Explain how automatic stabilizers work.

The Fiscal Policy Dilemma

The fiscal policy dilemma is what to do in periods of structural stagnation when both deficits and a balanced budget are called for.

- When an economy falls into a structural stagnation, the effectiveness of expansionary demand-side policy is limited.
- International conditions, political considerations, and institutional issues make it impossible to achieve a sustainable growth rate consistent with the type of jobs and pay acceptable by most people.

Classical Economics and Sound Finance

Economists' view of public finance and fiscal policy before 1930's supported:

- **Sound finance,** a view of fiscal policy that the government budget should always be balanced except in wartime
  - This view was based on a combination of political and economic grounds, but primarily on political grounds

Ricardian Equivalence Theorem: Deficits Don't Matter

Classical economists also believed the argument for balanced budgets were weak. David Ricardo's theory is called the Ricardian equivalence theorem.

Ricardian equivalence theorem: Deficits do not affect the level of output because people increase savings to pay future taxes to repay the deficit.

Most economists felt that, in practice, deficits could affect output and that it mattered a lot.

The Sound-Finance Precept

Given the collapse of economic expectations in the 1930s, many economists of the time favored giving up the principle of sound finance, at least temporarily, and using government spending to stimulate the economy.

If the economy is in a small recession, do nothing.

If the economy is in a depression, use deficit spending.

Keynesian Economics and Functional Finance

In 1940's, economists view of public finance and fiscal policy changed with J.M Keynes' *The General Theory* and followed with Abba Lerner's *The Economics of Control.*

Functional finance held that governments should make spending and taxing decisions on the basis of their effect on the economy, not on the basis of some moralistic principle that budgets should be balanced.

If spending was too low, government should run a deficit; if spending was too high, government should run a surplus.

Functional finance nicely fits the *AS*/*AD* model.

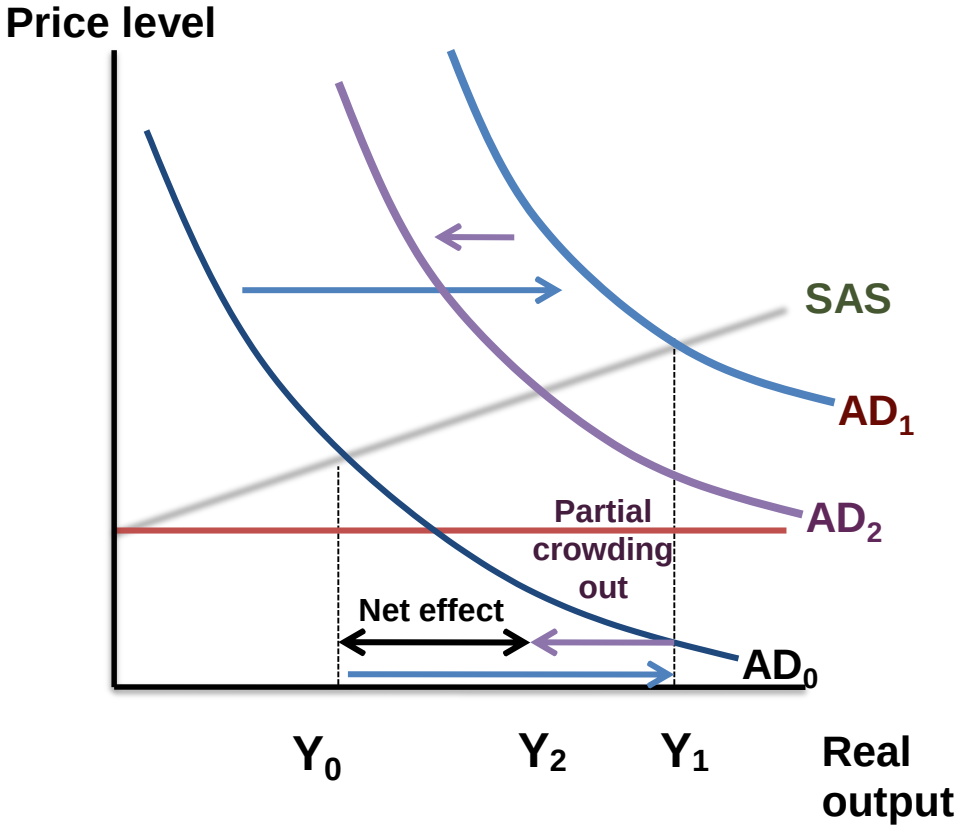
Assumptions of the *AS/AD* Model

Six assumptions of the *AS/AD* model that could lead to problems with fiscal policy are:

1. Financing the deficit doesn't have any offsetting effects.
2. Government knows what the situation is.
3. Government knows the economy's potential income level.
4. Government has flexibility in changing spending and taxes.
5. The size of the government debt doesn't matter.
6. Fiscal policy doesn't negatively affect other goals.

Crowding Out

Crowding out is the offsetting of a change in government expenditures by a change in private expenditures in the opposite direction.



The Government Knows the Situation

Data problems limit fiscal policy for fine tuning.

- Getting reliable numbers on the economy takes time.
- We may be in a recession and not know it.

The government relies on large macroeconomic models and leading indicators to predict where the economy will be like in the future, but the forecasts are imprecise.

The Government Knows the Economy's Potential Income Level

No one knows for sure the potential *full-employment* income.

Economists now see full employment to be closer to 4 percent.

Differences in estimates of potential income often lead to different policy recommendations.

In most cases, the U.S. economy is in an ambiguous state where some economists are calling for expansionary policy and others are calling for contractionary policy.

The Government has Flexibility in Changing Taxes and Spending

Putting fiscal policy into place takes time and has serious implementation problems.

Numerous political and institutional realities in the U.S. today make implementing fiscal policy difficult.

Disagreements between Congress and the President may delay implementing appropriate fiscal policy for months, even years.

The Size of the Government Debt Doesn't Matter

Although there is no inherent reason why activist functional finance policies should have caused persistent deficits, increases in government debt have occurred for three reasons:

1. Early activists favored not only fiscal policy, but also large increases in government spending.

2. Politically it's easier for government to increase spending and decrease taxes than vice versa.

3. Most economists believe that a country's debt becomes a problem somewhere around 90 to 100 percent of a country's GDP.

Fiscal Policy Doesn't Negatively Affect Other Government Goals

A society has many goals: achieving potential income is only one of those goals.

National economic goals may conflict.

For example, when the government runs expansionary fiscal policy, the trade deficit increases.

Building Fiscal Policies into Institutions

To avoid the problems of direct fiscal policy, economists have attempted to build fiscal policy into U.S. institutions.

An **automatic stabilizer** is any government program or policy that will counteract the business cycle without any new government action.

Automatic stabilizers include:

- Welfare payments
- Unemployment insurance
- The income tax system

How Automatic Stabilizers Work

When the economy is in a recession, the unemployment rate rises.

Unemployment insurance is automatically paid to the unemployed, offsetting some of the fall in income.

Income tax revenues also decrease when income falls in a recession, providing a stimulus to the economy.

Automatic stabilizers also work in reverse.

- When the economy expands, government spending for unemployment insurance decreases and taxes increase.

State Government Finance and Procyclical Fiscal Policy

State constitutional provisions mandating balanced budget act as automatic destabilizers.

- During recessions states cut spending and raise taxes.
- During expansions states increase spending and cut taxes.

Procyclical fiscal policy is changes in government spending and taxes that increase the cyclical fluctuations in the economy instead of reducing them.

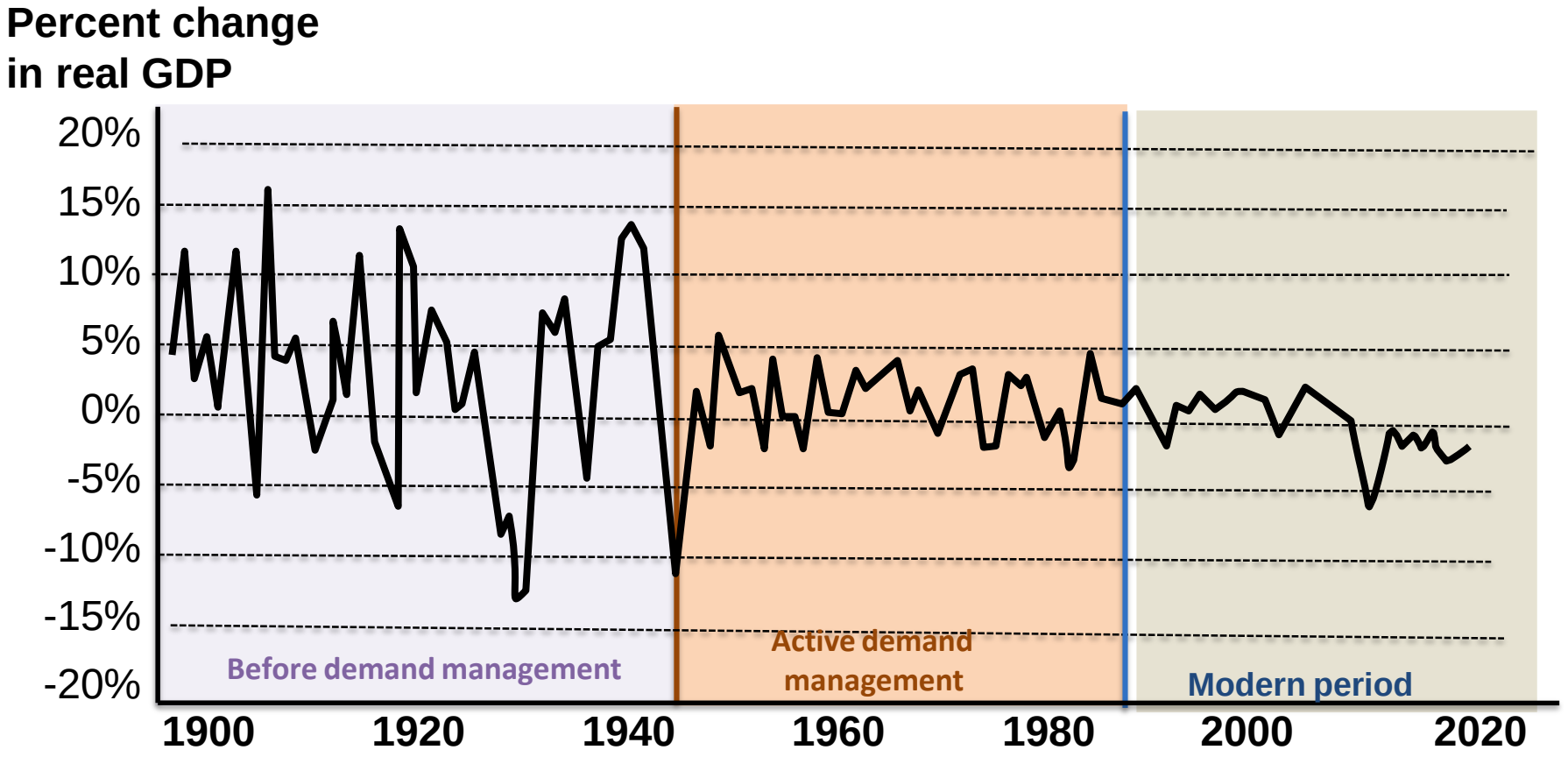
The Negative Side of Automatic Stabilizers

When the economy is first starting to climb out of a recession, automatic stabilizers will slow the process, rather than help it along, for the same reason they slow the contractionary process.

As income increases, automatic stabilizers increase government taxes and decrease government spending, and as they do, the discretionary policy's expansionary effects are decreased.

Decrease in Fluctuations in the Economy

Compared to the early 1900s, fluctuations in the economy have decreased; this suggests that policy makers have done something right.



Conclusion

The modern macro policy precept is a blend of functional and sound finance.

Modern economists' suggestion of government policy in a recession is to do nothing in terms of specific tax or spending policy, but let the automatic stabilizers in the economy do the adjustment. The two exceptions to this rule:

1. When falling into a severe recession or depression, then the government should run expansionary fiscal policy.
2. When experiencing a hyperinflation, the government should run a contractionary fiscal policy.

Chapter Summary (119 of

Sound finance is a view that the government budget should always be balanced except in wartime.

The Ricardian equivalence theorem states that it doesn't matter whether government spending is financed by taxes or deficits; neither would affect the economy.

Although proponents of sound finance believed the logic of the Ricardian equivalence theorem, they believed deficit spending could affect the economy.

Still, because of political and moral issues, proponents of sound finance promoted balanced budgets.

Chapter Summary (120 of

Functional finance is the theoretical proposition that governments should make spending and taxing decisions based on their effect on the economy, not moralistic principles.

Six problems that make functional finance difficult to implement are:

1. Interest rate crowding out.
2. The government not knowing what the situation is.
3. The government not knowing the economy's potential income.
4. Government's inability to respond quickly enough.
5. The size of government debt not mattering.
6. Conflicting goals.

Chapter Summary (121 of

Activist fiscal policy is now built into U.S. economic institutions through automatic stabilizers.

Economists agree that if the economy is headed toward a depression or hyperinflation, follow the precepts of functional finance—expansionary fiscal policy to offset a depression and contractionary fiscal policy to offset hyperinflation. If the economy is experiencing moderate fluctuations, follow the precepts of sound finance—balance the budget.

CHAPTER 7

Inflation, Deflation, and Macro Policy

Chapter Goals

- Know the difference between goods inflation and asset inflation.
- List and discuss the costs and benefits of inflation.
- Summarize the inflation process and the quantity theory of money.
- Define the Phillips curve relationship between inflation and unemployment.

Defining and Measuring Inflation

Inflation is a continuous rise in the price level and is measured with price indexes.

There are two types of inflation:

- Goods price inflation
- Asset price inflation

Asset prices and goods prices don't always move in tandem because there are periods of asset price bubbles.

Defining and Measuring Inflation

Asset price inflation occurs when the prices of assets rise more than their "real" value.

Assets include: gold, houses, artwork, collectibles, land, stocks, bonds and many other items that people hold as a store of wealth.

There is no measure of asset price inflation since it's difficult to know when the real value of assets increase.

Does Asset Inflation Matter?

- The ratio of nominal wealth to nominal GDP can serve as a rough estimate whether asset price inflation exceeds goods price inflation.
- Asset price inflation can lead to serious misallocation of resources from conservative to risky investments.
- Asset deflation reverses many of the positive effects of asset inflation.
- The pain caused by the asset price deflation exceeds the pleasure caused by the asset price inflation.

The Distributional Costs of Inflation

Unexpected inflation redistributes income from lenders to borrowers.

- If lenders charge a nominal rate of 5% and expect inflation to be 2%, the expected real rate is 3%.
- If inflation is actually 4%, the real rate is only 1%.

People who do not expect inflation or who are tied to fixed nominal contracts will likely lose in an inflationary period.

The Distributional Costs of Asset Price Inflation

People who bet on rising asset prices are helped and those did not are hurt.

Cautious borrowers are hurt because they see the asset prices as being too high, and choose not to borrow.

Less cautious borrowers are helped because they borrow at low interest rates and receive high returns when their assets increase in value.

The Benefits of (Low) Inflation

Inflation can facilitate relative price changes.

Allowing more expansionary monetary policy.

> **Zero interest rate lower bound** – a limit on how much interest rates can fall.

Inflation as a placebo – inflation pushes up the value of assets which encourages people to invest.

The Danger of Accelerating Inflation

Asset price inflation redistributes wealth from cautious individuals to less cautious individuals.

Goods price inflation redistributes income, and reduces the amount of information prices are supposed to convey.

Inflation is a very serious problem if it increases to **hyperinflation,** when inflation hits triple digits, 100 percent or more a year.

Hyperinflation breaks down confidence in the monetary system, the economy, and the government.

The Inflation Process and The Quantity Theory of Money

Expectations play a key role in the inflationary process.

Rational expectations are the expectations that the economists' models predict.

Adaptive expectations are expectations based in some way on the past.

Extrapolative expectations are expectations that a trend will continue.

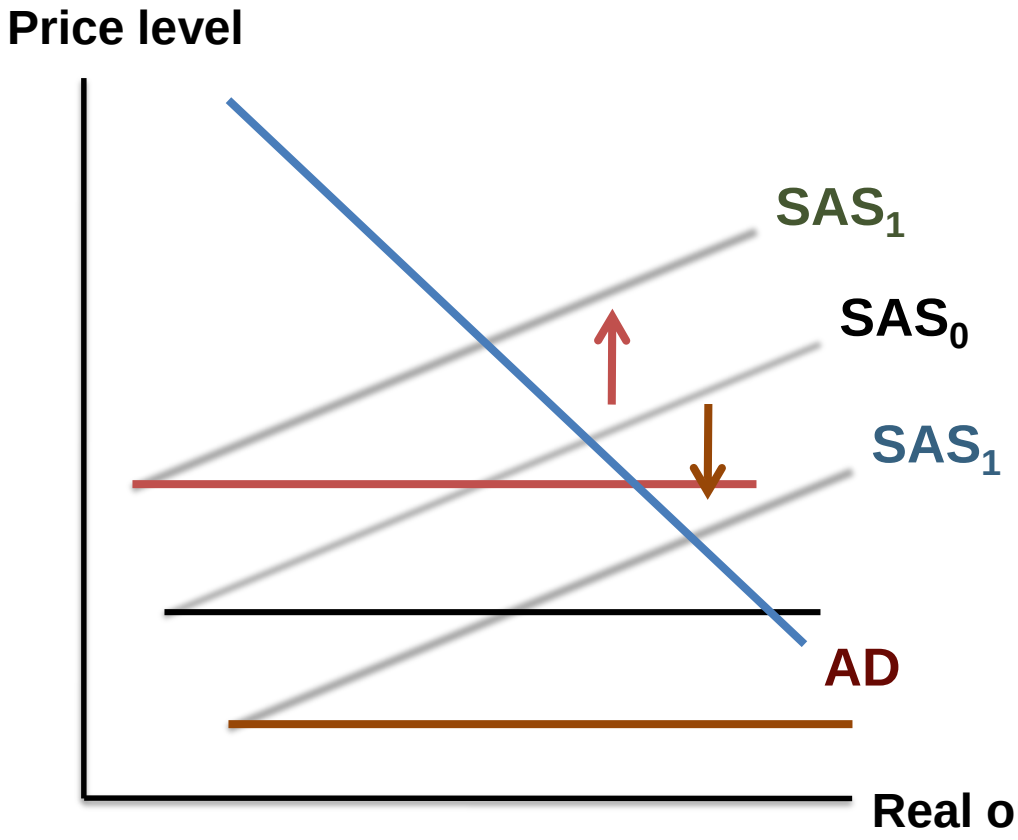
Productivity, Inflation, and Wages

Changes in productivity and changes in wages determine whether inflation may be coming.

There will be no inflationary pressures if wages and productivity increase at the same rate.

Inflation = Nominal wage increases – Productivity growth

Nominal Wages, Productivity, and Inflation



When nominal wages increase by more than the growth of productivity, the SAS curve shifts up, resulting in inflation.

When nominal wages increase by less than the growth of productivity, the *SAS curve shifts* down, resulting in deflation.

The Quantity Theory of Money and Inflation

The **quantity theory** emphasizes the connection between money and inflation.

The **equation of exchange** is: **MV = PQ**

M = Quantity of money Q = Real output

V = Velocity of money P = Price level

Velocity of money is the number of times per year, on average, a dollar gets spent on goods and services.

$$\text{Velocity} = \frac{\text{Nominal GDP}}{\text{Money Supply}}$$

Three Assumptions of Quantity Theory

1. Velocity is constant.
2. Real output (Q) is independent of money supply.
    - Q is autonomous, determined by forces outside those in the quantity theory.
3. Causation goes from money to prices.
    - The quantity theory says that the price level varies in response to changes in the quantity of money.
    - $\%\Delta M \rightarrow \%\Delta P$
    - $MV \rightarrow PQ$

The Declining Influence of the Quantity Theory

Velocity is not constant: Since 2008 velocity has decreased enormously.

Breakdown in the connection between money and inflation: In 2008, the money supply fell significantly, but goods inflation hardly fell at all.

Even though the quantity theory is no longer directly applicable, its general point remains relevant.

Inflation and the Phillips Curve Trade-Off

The **short-run Phillips curve** is a downward-sloping curve showing the relationship between inflation and unemployment when expectations of inflation are constant.

In the 1970s, there was **stagflation**, the combination of high and accelerating inflation and high unemployment.

The Long-Run and Short-Run Phillips Curves

Actual inflation depends both on supply and demand forces and on how much inflation people expect.

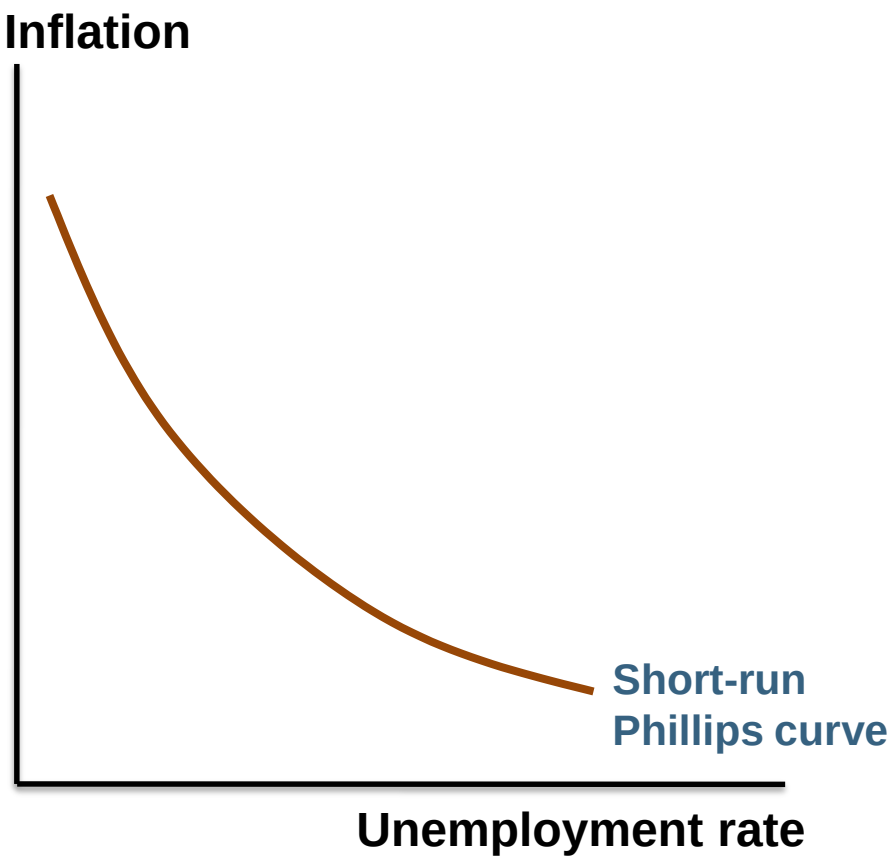
At all points on the **short-run Phillips curve**, expectations of inflation (the rise in the price level that the average person expects) are fixed.

At all points on the **long-run Phillips curve**, expectations of inflation are equal to actual inflation.

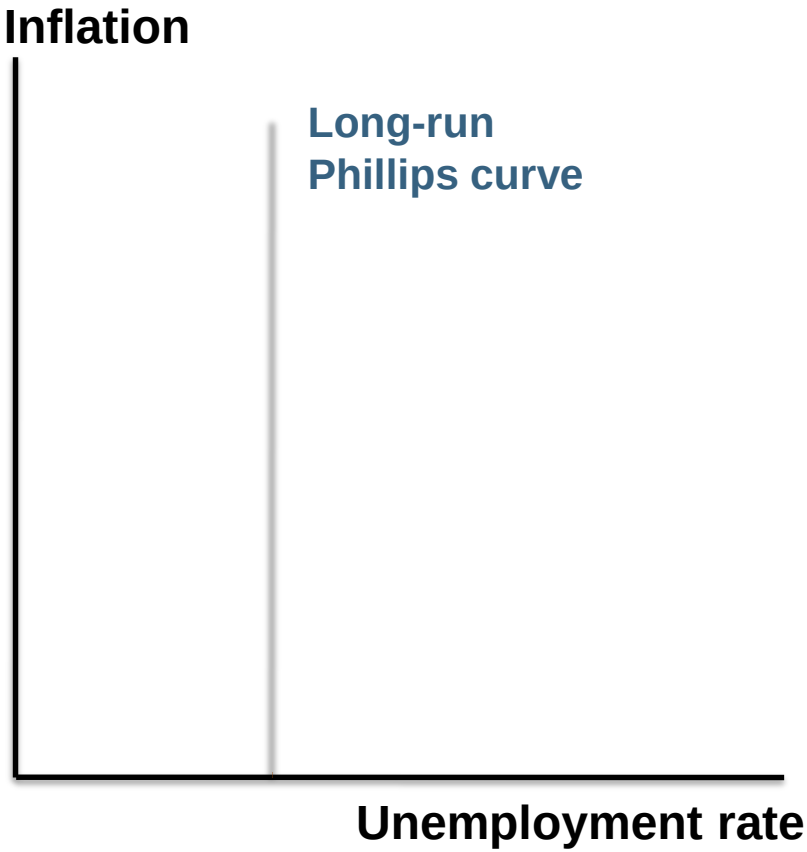
The ***long-run Phillips curve*** is a vertical curve at the unemployment rate consistent with potential output.

The Phillips Curve Trade-Off

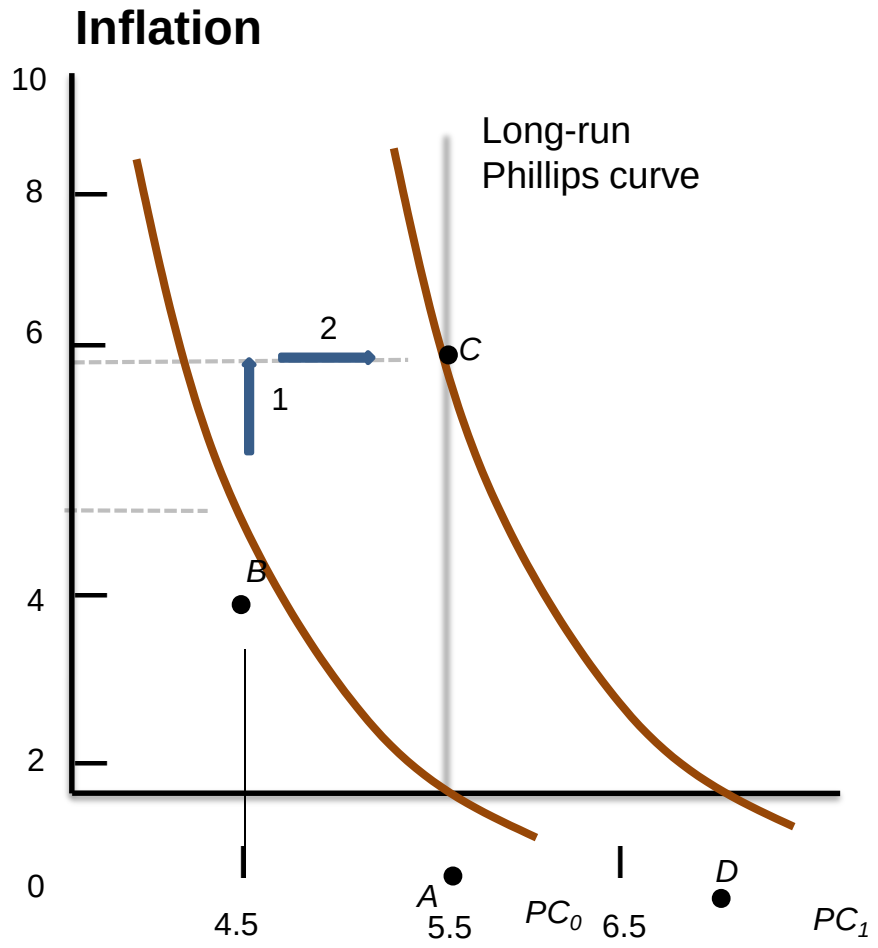
In the short-run Phillips curve, there is a trade-off between inflation and unemployment.



In the long-run Phillips curve, there is no trade-off; curve is vertical.



Moving Off the Long-Run Phillips Curve



Economy is initially at point *A* when the government runs expansionary policy to reduce unemployment below 5.5 percent.

Economy moves from point *A* to point *B.*

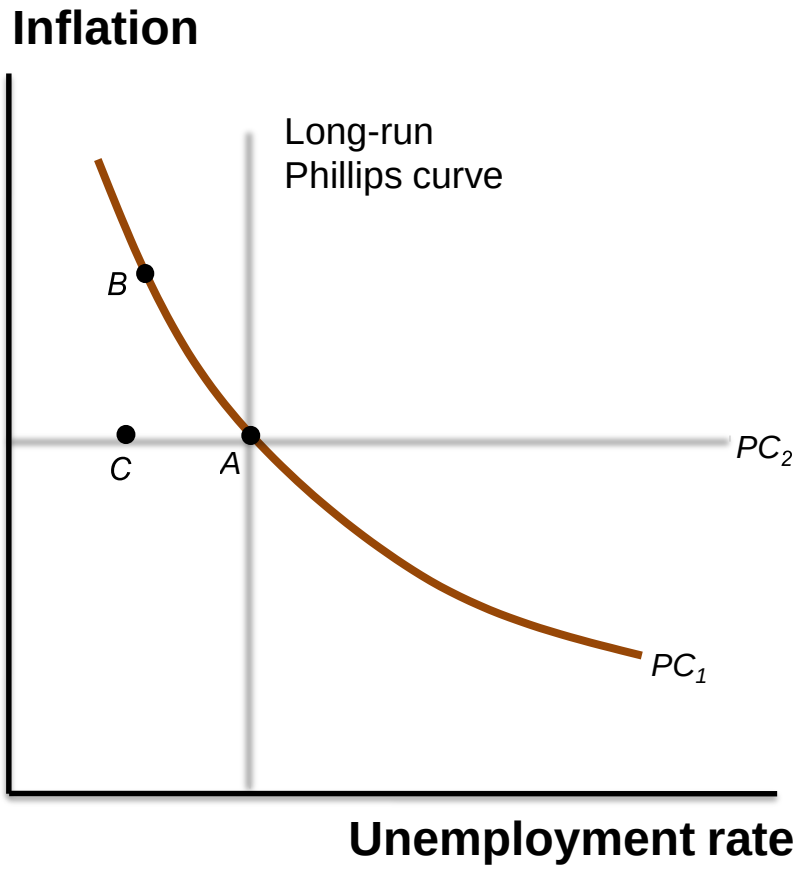
Expectations of inflation increase, and the short-run Phillips curve begins shifting up (arrow 1).

Upward pressure will stop only when rate of unemployment moves back to target rate (arrow 2).

Economy returns to equilibrium at point C.

Unemployment rate

Global Competition and the Phillips Curve



When the world price level is below the domestic price level, inflation is held down by globalization.

A decline in the unemployment rate will not lead to inflation.

The standard short-run Phillips curve (PC_1) changes to a flat short-run Phillips curve (PC_2).

Chapter Summary (143 of

At one time, inflation was measured as an increase in the money supply.

Inflation can occur for both goods and assets.

The standard goods market price indexes for judging policies are limited as they do not include the prices of assets.

The winners in inflation are people who can raise their wages or prices and still keep their jobs or sell their goods.

The losers in inflation are people who can’t raise their wages or prices.

Chapter Summary (144 of

Asset inflation hurts people who save with safe assets and helps those who save in risky assets.

Inflation has both costs and benefits. Conventional monetary policy emphasizes informational, institutional and distributional costs.

Inflation equals nominal wage increases minus productivity growth.

Expectations of inflation can accelerate inflation and in some cases lead to hyperinflation.

Chapter Summary (145 of

According to the quantity theory of money, policy analysis about the real economy is based on the supply side of the economy.

The lack of a clear relationship between money growth and inflation undermines the quantity theory of money.

The short-run Phillips curve holds expectations constant; The long-run Phillips curve allows expectations of inflation to change; globalization can lead to a flat short-run Phillips curve.

Macroeconomics

Preparatory course,

University of Rome Tor Vergata

Fall 2023

Carlo Ciccarelli

Our three social challenges

1. Structural inequities.
2. Environmental degradation.
3. The sweeping effects of climate change.

- They mirror the shortage of *public goods* (justice and equal opportunities, safe and productive environment).

- The provision of public goods requires an adequate *monetary system*, because it shapes possibilities and incentives of economic actors.

Global wealth report – Credit Suisse (credit-suisse.com)

87.8% of P went from 16.1% to 15% of W. Italy: 80% of P has 30% of W.

Figure 1: The global wealth pyramid end-2019

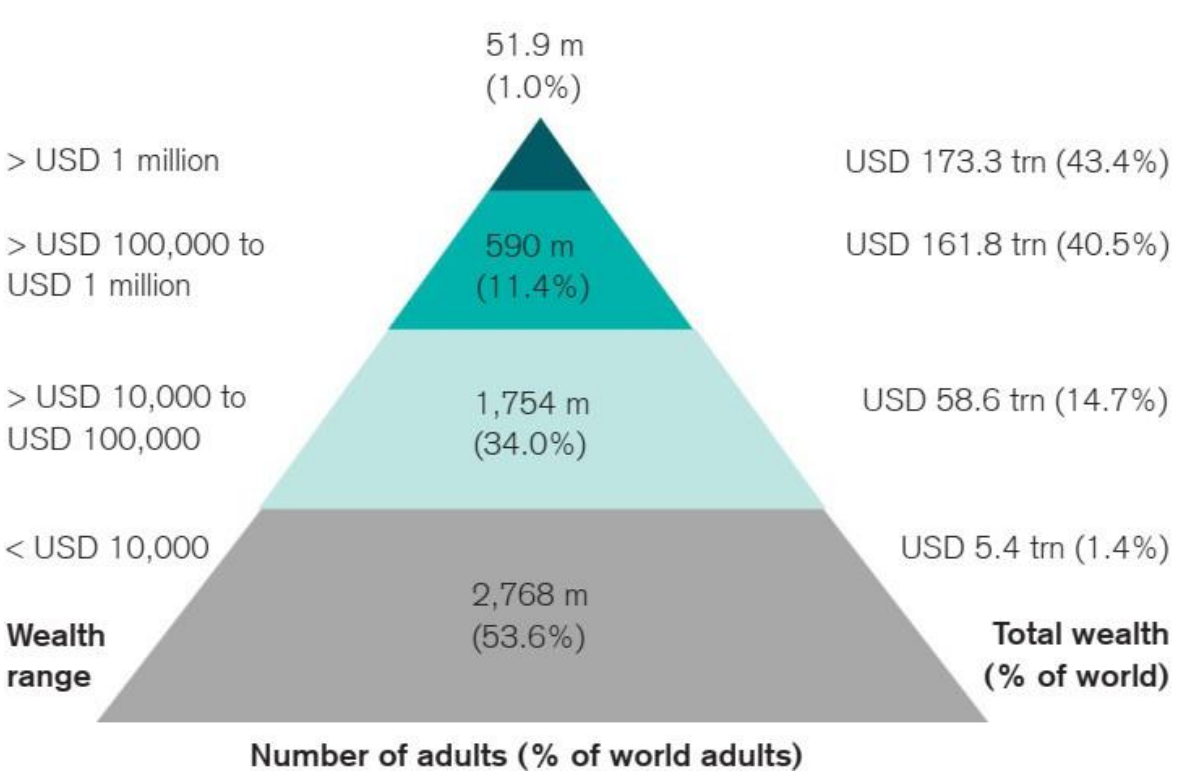
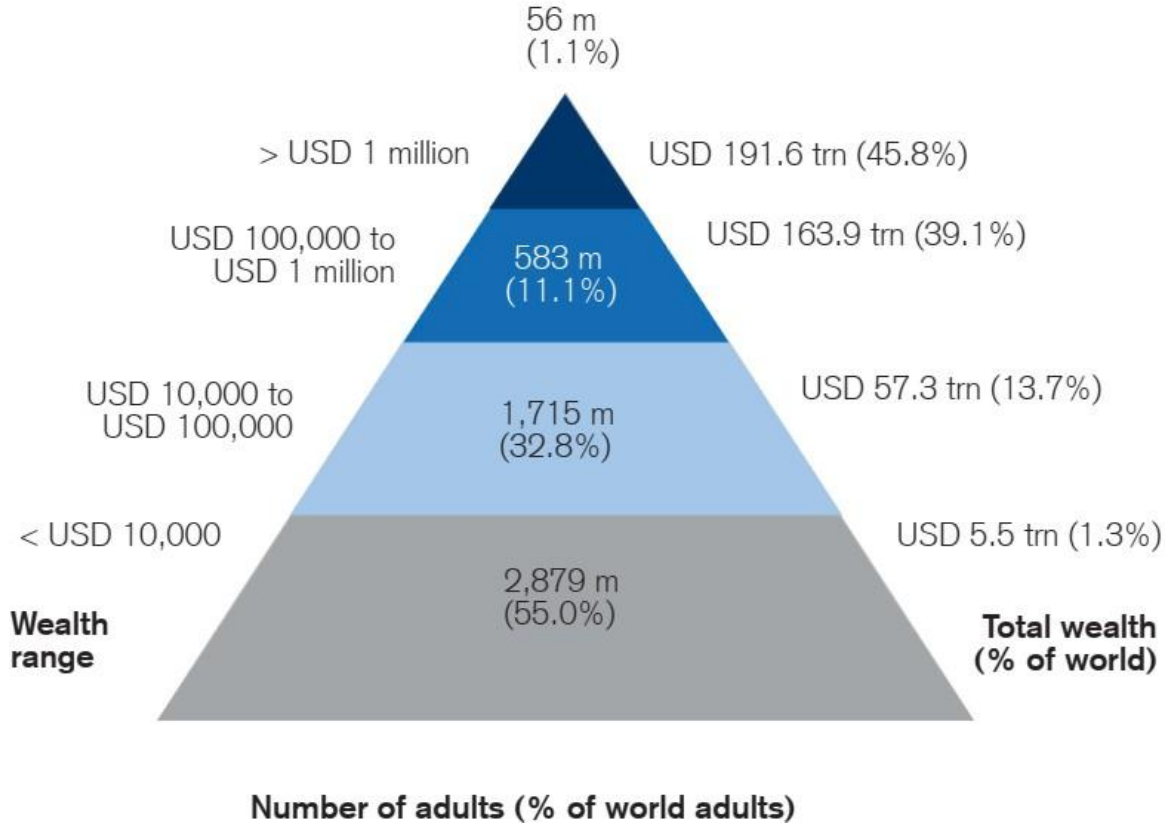


Figure 1: The global wealth pyramid 2020



The Supply of Money

1. Monetary Economy: money and financial assets
2. Some Data: debt and monetary aggregates
3. Debt Money and Equity Money
4. Money Supply in the Euro Area
    a. Commercial Bank Money
    b. Central Bank Money
        i. Reserves
        ii. Banknotes
        iii. Coins
    c. Government Debt and Tax Liability
    d. Conclusion

1. Monetary Economy

- A monetary economy lies between a Barter Economy and a Pure Credit Economy.

- Barter Economy: quid pro quo exchange of goods and services. Limit: impossible complexity and/or specialization in production and consumption.

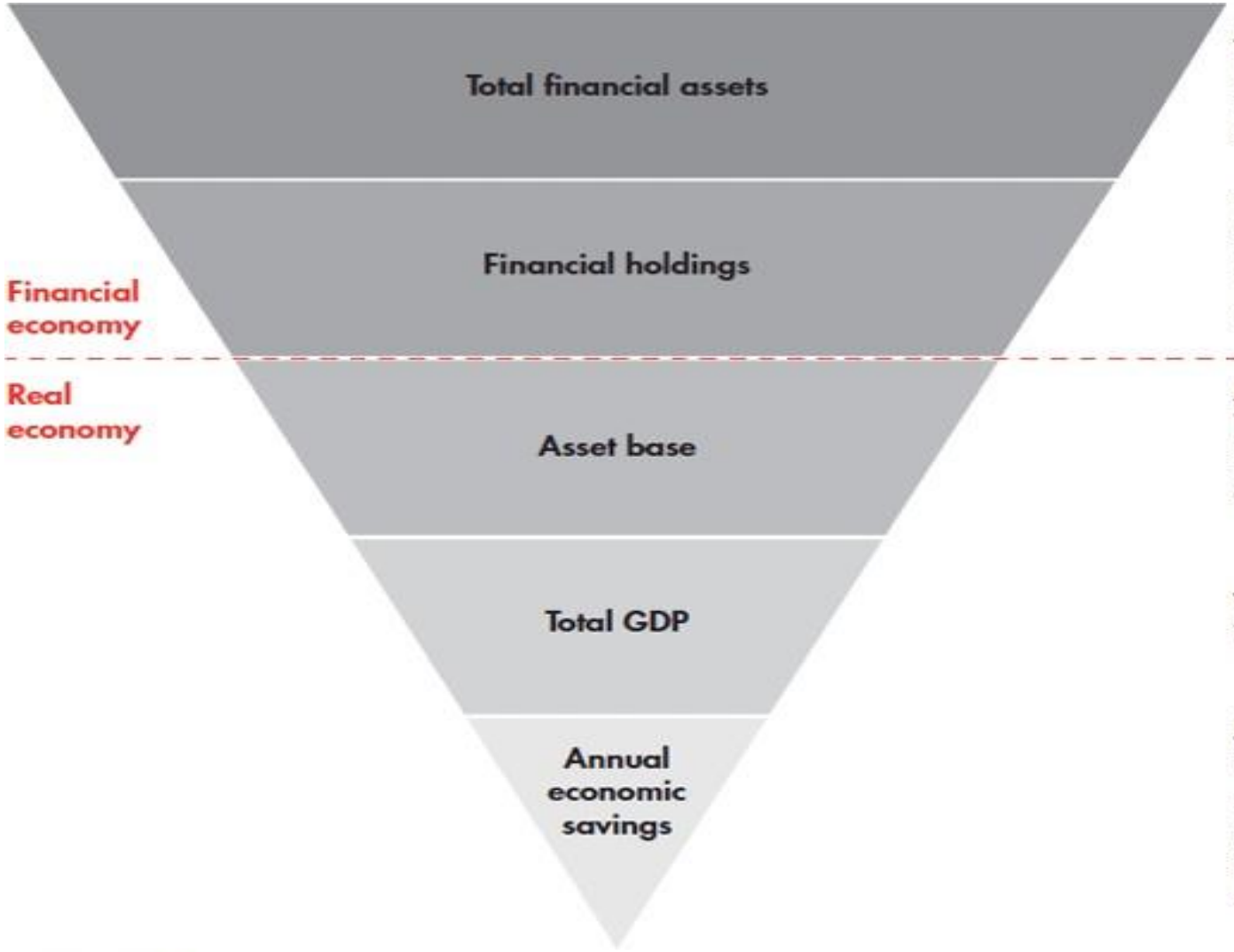
- Pure Credit Economy: each person makes promises in a social accounting scheme. Requirements: perfect monitoring of all credit/debit positions of all agents, plus a form of punishment for excessive debt.

1. Monetary Economy

- Monetary Economy: (many) transactions involve a medium of exchange.
- Money: any command over *general* purchasing power which is accepted as medium of exchange and legal tender on the spot (means of payment).
- Financial asset (e.g.: bond, equity): a promise of money.

1. Monetary Economy

https://www.bain.com/insights/a-world-awash-in-money/



All financial assets of all sectors
Includes financial holdings of direct owners, as well as financial assets controlled by and held on the balance sheet of banks and other financial intermediaries

Financial assets of all sectors excluding the financial sector
Securities, mutual funds and other financial instruments in the hands of households, corporations, governments and other direct owners

Accumulated tangible and nontangible assets of all sectors
The sum total of all factories, farms, infrastructure, intellectual property and the like—everything that might appear as a nonfinancial asset on a balance sheet

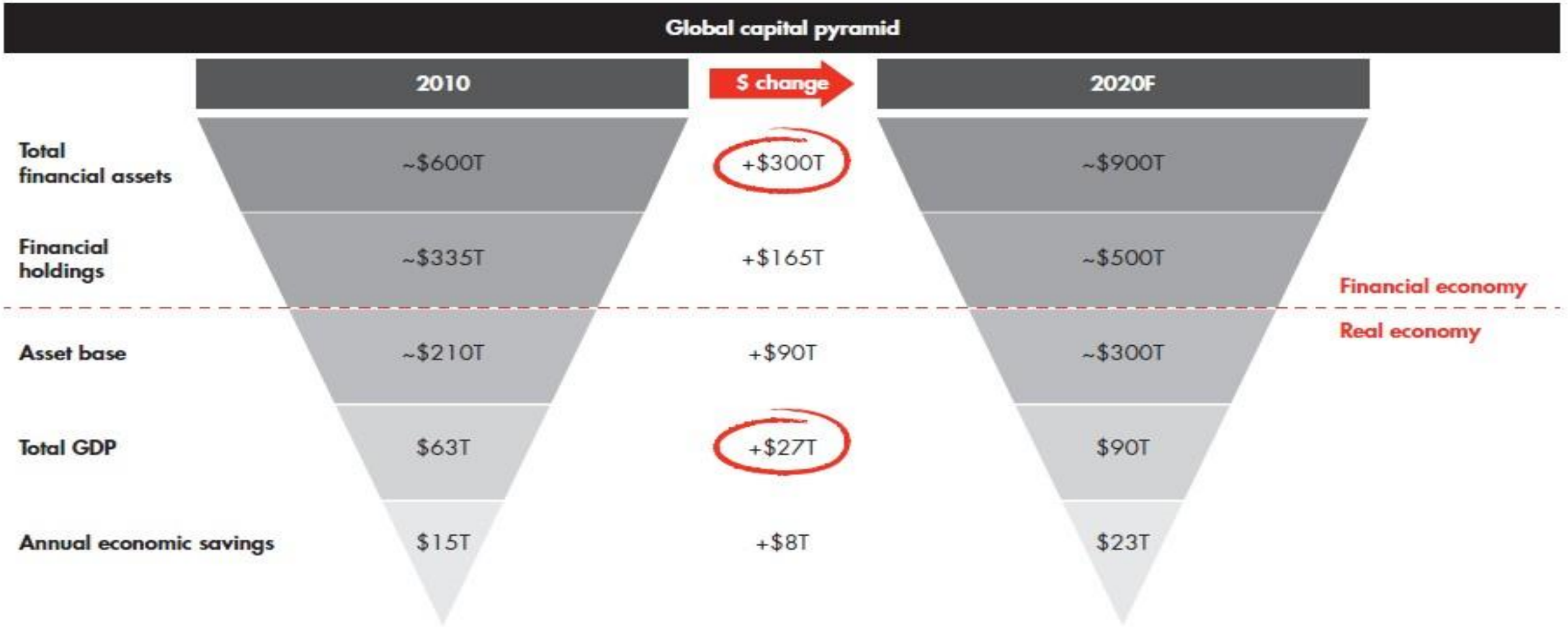
Total annual economic output
Total global GDP, or the real output of goods and services

Annual economic output not immediately consumed
Derived from gross world savings (the sum of gross national savings at the country level), this represents the underlying free GDP available for investments. It does not include depreciation, so some of this amount needs to be reinvested to maintain a constant asset base.

Source: Bain & Company

2. Data

Figure 1.1: A $27 trillion growth in global GDP will support a $300 trillion increase in total financial assets by 2020



Sources: National statistics; International Monetary Fund; OECD; Bain Macro Trends Group analysis, 2012

2. Data

- Global Debt as % of world GDP:
  - 2009: 213%
  - 2018: 225% (https://www.weforum.org/agenda/2018/06/the-anatomy-of-global-debt)
  - 2020: 356% ($281 trillion) (Global debt soars to 356% of GDP - Axios)

- Global Debt Database (IMF): https://www.imf.org/external/datamapper/datasets/GDD

2. Data: Euro area (Q1 ‘21)

ECB, Statistical Data Warehouse: https://sdw.ecb.europa.eu/

- GDP 2020 = €11.4 trillions
- Debt-to-GDP ratio: 256%
  - Households: 72%
  - Non-Financial Firms: 84%
  - Government: 100%

- Currency and Deposits = €35T
- S-T Debt (€1.7T) + L-T Debt (€19T) = €20.7T
- Listed Equity (€9T) + Unlisted Equity (€22.3T) + Other Equity (€6.1T) = €37.5T
- Loans = €27T
- Insurance and pension = €10T
- Other accounts payable = €9T
- Total Financial Liabilities = €156T (GDPx13.5)
- Financial Net Worth: -0.2T

2. Data: Euro area (Q3 ‘20)

- M1 = € 10.8 T : *A “narrow” monetary aggregate that comprises currency in circulation and overnight deposits*.

- M2 = € 14.3 T : *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 = credit to euro area residents (no gov) = € 15 T : *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*.

2. Data: Euro area (Q1 ‘21)

ECB balance sheet = € 8.2 T, 72% of GDP

Selected Assets = € 6.8 T

- Lending to credit institutions = € 2.2 T
- Securities from QE = € 4.6 T

Selected Liabilities = € 6.8 T

- Banknotes in circulation = € 1.5 T
- Deposits = € 5.3 T

banks in EA (€4.45T)+ other EA residents (€0.85T)

3. Debt Money and Non-Debt Money

- *[W]e can draw the line between "money" and "debts" at whatever point is most convenient for handling a particular problem.* J. M. Keynes (1936).

- "Money is debt" is always true if we refer to debt as both real and financial obligation.
- When money represents a real obligation, however, it does not need to be also a financial obligation.
- From a financial point of view, money can also be a non-debt (equity) asset.
- Example: equity money as a real obligation.

3. Debt Money and Equity Money

- Debt money: the issuer creates and lends money, waiting for reimbursement (principal + interest). At least one agent in the economy holds the money as an asset, and another agent (the borrower) has the offsetting obligation, i.e. a financial debt. When the borrower reimburses the loan, the monetary asset disappears.

- Equity money: the issuer creates and spend money. No economic agent in the economy has a financial debt. The society has a real debt toward the holder of the monetary asset, given its purchasing power.

3. Debt Money and Equity Money

- Characteristics of Debt Money:
  - creation/allocation of purchasing power according to the “financial profit” rule;
  - creation of a structural financial deficit, as the interest is not created at the lending time → “the problem of profits”.

- Characteristics of Equity Money:
  - creation/allocation of purchasing power according to other goals than financial profit;
  - no structural financial deficit;
  - it does not need to be inflationary, as explained by M. Woodford and A. Turner here: https://voxeu.org/article/helicopter-money-policy-option

3. Debt Money and Equity Money

- This is the abstract of Prof. Bolton's Presidential Address of "The American Finance Association" in 2015: "Debt and Money: Financial Constraints and Sovereign Finance".

<<Economic analyses of corporate finance, money, and sovereign debt are largely considered separately. I introduce a novel corporate finance framing of sovereign finance based on the analogy between fiat liabilities for sovereigns and equity for corporations. The analysis focuses on financial constraints at the country level, making explicit the trade-offs involved in relying on domestic versus foreign-currency debt to finance investments or government expenditures. This framing provides new insights into issues ranging from the costs and benefits of inflation, optimal foreign exchange reserves, and sovereign debt restructuring.>>

- His "fiat liability" corresponds to our "equity money".

4. Money Supply in the Euro Area

a. Commercial Bank Money

b. Central Bank Money
   i. Reserves
   ii. Banknotes
   iii. Coins

c. Government Debt and Tax Liability

4.a Commercial Bank Money

- Creation
- Circulation
- Destruction
- Capital Market & Illiquidity from Credit Crunch
- Limits to Creation: Demand of Credit and Capital Requirement (and Reserves?)

4.a Commercial Bank Money: creation

- When a bank grants a loan to an agent, the bank increases both its asset and liability sides of the balance sheet by registering the loan as its credit and borrower's deposit. The same deposit shows up on the agent's asset side, with the corresponding debt on his or her liability side.
- Call x_i^u the liability x issued by i and in possession of u, "i owes u". As in Figure 1, Agent 1 (A1) and Bank 1 (B1) create a double book-keeping entry in their balance sheets through the emission of liability b_A1 and d_B1.

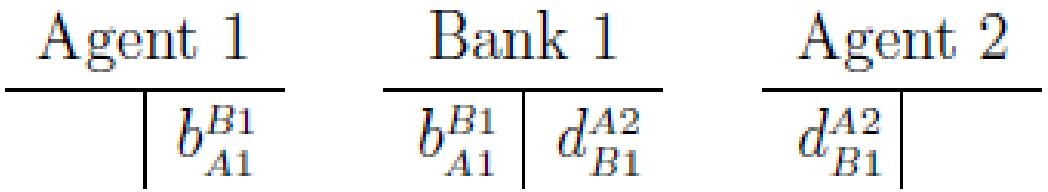
Figure 1: Creation of bank money

Agent 1	
d_{B1}^{A1}	b_{A1}^{B1}

Bank 1	
b_{A1}^{B1}	d_{B1}^{A1}

4.a Commercial Bank Money: circulation

Figure 2: Circulation of bank money



- After receiving d_{B1}, Agent 2 (Agent 1) has a positive (negative) net financial position.

➢ The amount of money in the hand of Agent 2 is backed by the debt of the Agent 1, the initial borrower.

- Assume Agent 1 goes bankrupt (Agent 1 has no money at the repayment date of b_{A1}). Thus, the bank's asset side shrinks because b_{A1} is worth zero, and so the value of Agent 2's deposit.

4.a Commercial Bank Money: destruction

- When Agent 2 uses the deposit to buy something from Agent 1, then Agent 1 holds an asset and a liability position in the bank's balance sheet.

- To repay the loan, Agent 1 uses their deposit.

- Balance sheets of Agent 1 and Bank 1 shrink to zero.

- NOTE: this was a loan with zero interest: the problem of profits.

4.a Co. B. M.: Capital Market & Credit Crunch

- Suppose that in Figure 2 Agent 2 uses d_{A2}^{B1} to finance Agent 3, i.e. to buy its liability b_{A3}, as in Figure 4. This operation can be generically seen as capital market financing.

Figure 4: Bank money and capital market

Agent 1	
	b_{A1}^{B1}

Bank 1	
b_{A1}^{B1}	d_{B1}^{A3}

Agent 2	
b_{A3}^{A2}	

Agent 3	
d_{B1}^{A3}	b_{A3}^{A2}

4.a Co. B. M.: Capital Market & Credit Crunch

- Suppose that Agent 3 transfers d_{A3}^{B1} to Agent 1, as in Figure 5.

Figure 5: Bank money and capital market - 1

Agent 1		Bank 1		Agent 2		Agent 3	
d_{B1}^{A1}	b_{A1}^{B1}	b_{A1}^{B1}	d_{B1}^{A1}	b_{A3}^{A2}			b_{A3}^{A2}

- If Agent 1 repays the debt with the bank, and Bank 1 does not extends new credit to the economy (credit crunch), then the system experiences a liquidity crisis, because there are no more units of account to settle the debt between Agent 2 and Agent 3, as in Figure 6.

Figure 6: Bank money and capital market - credit crunch

Agent 2		Agent 3	
b_{A3}^{A2}			b_{A3}^{A2}

4.a Co. B. M.: Capital Market & Credit Crunch

- If the banking system does not issue new money, i.e. credit, the deficit of means of payment increases the default probability on b_{A3}. If the liability is equity, its value decreases.
- This is a sharp example. In reality, it is sufficient that another deposit circulates among agents in such a way that all liabilities are paid off.
- Still, this is exactly what happens in a credit crunch. A shortage of units of account makes more difficult for debtors to get them and reimburse their debts, because 1) banks do not roll over loans and at maturity money is destroyed and 2) agents with money try to keep it (money hoarding).

4.a Co. B. M.: Capital Market & Credit Crunch

- The longer the chain of direct finance for a unit of money, the higher the probability of liquidity and solvency problems when banks destroy that unit of money. In the Euro Area, €35T of deposits finance €121T of liabilities (total - deposits), that is €3.5 of liability for each euro of money.

- Outside the banking system, but based on bank money, equity and debt positions are created through capital markets. Hence, capital markets leverage on bank money. The longer the chains of direct finance, the higher the illiquidity problems during a contraction of the money supply by the banking system.

4.a Commercial Bank Money: limits

- Limits to the expansion of bank credit:

1. The demand for loans.
2. Loan's profitability.
3. Capital ratios. (Where does bank's equity come from?)
4. Monetary policy affecting 1-2-3
5. Reserves?

- See Bundesbank (2017) on the course webpage or here https://www.bundesbank.de/resource/blob/654284/df66c4444d065a7f519e2ab0c476df58/mL/2017-04-money-creation-process-data.pdf

4.a Commercial Bank Money

- Banks' liabilities circulating as medium of exchange are debt money.

- At the issuing time, the interest payment is not created. The consequences are a combination of (Messori M., and Zazzaro A., 2005):
  - rising nominal debt level;
  - bankruptcy.

4.b.i. Reserves

1. A rationale for the existence of reserves: banking sector's means of payment.

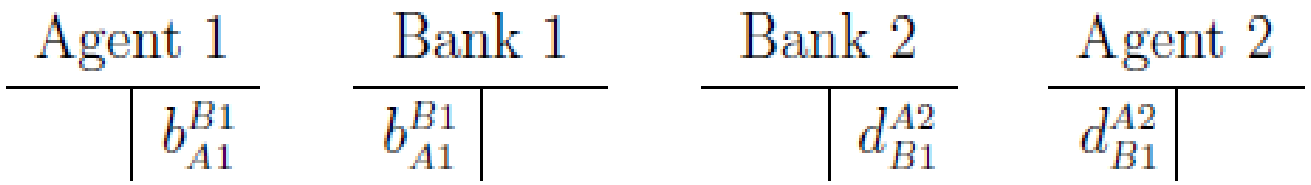
2. The emission of reserves.

3. Summary.

4.b.i. Reserves: a rationale

- Reserves as interbank means of payment
- Suppose that Agent 1 originally transferred its deposit to Agent 2 with current account at Bank 2. The transfer of a liability involves different incentives, and thus works differently, from that of an asset.
- Would you accept a liability for free, as Bank 2 in Figure 7? Presumably not.

Figure 7: Circulation of bank money - banking system



4.b.i. Reserves: a rationale

- In accepting the liability d_{B1} by Bank 1, Bank 2 must receive a claim on Bank 1's asset. Thus, the transfer of d_{B1} involves a credit/debt relation as the one we would observe in Figure 8, where h^{B2}_{B1} is the liability issued by Bank 1 in favour of Bank 2.

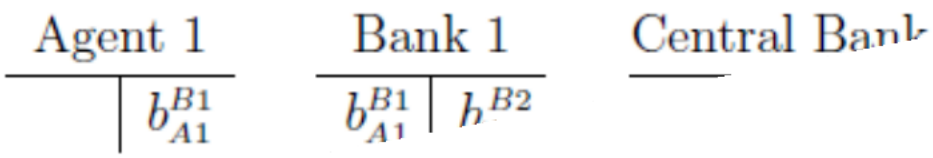
Figure 8: Circulation of bank money - banking system - credit/debit

Agent 1		Bank 1		Bank 2		Agent 2	
	b^{B1}_{A1}	b^{B1}_{A1}	h^{B2}_{B1}	h^{B2}_{B1}	d^{A2}_{B1}	d^{A2}_{B1}	

4.b.i. Reserves: a rationale

- Bank 1 could create more and more purchasing power to unreliable borrowers, with Bank 1's liability flowing to other banks.
- In order to discipline Bank 1 and to avoid accumulation of its liabilities, the banking sector uses central bank reserves to settle debts. Thus, using a partial accounting equilibrium, assume the existence of reserves on the asset side of Bank 1 and on the liability side of the central bank, as in Figure 9.

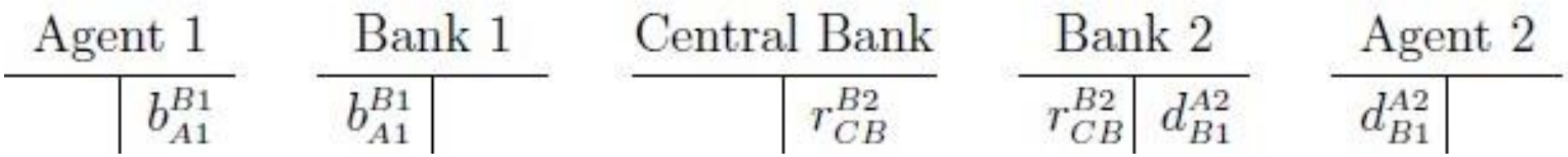
Figure 9: Circulation of bank money - banking system - ro



4.b.i. Reserves: a rationale

- Bank 1 uses reserves r_{CB}^{B1} to settle its debt h_{B1}^{B2} with Bank 2, that now has the claim r_{CB}^{B2} on the central bank, as shown in Figure 10.

Figure 10: Circulation of bank money - banking system - settlement



- Moving from partial to general accounting equilibrium, we need to understand reserve creation process.

4.b.i. Reserves: emission

- Understanding how reserves are issued can help to figure out if they are debt money or equity money.

- Reserve management instruments: OMOs, standing facilities, APPs.

- We are interested in the underlying transactions:
  - Reverse transaction (mainly on conventional basis);
  - Outright purchase of financial assets (mainly on unconventional basis).

4.b.i. Reserves: emission: reverse transaction

- A reverse transaction is defined by the ECB as “an operation whereby the central bank buys or sells assets under a repurchase agreement or conducts credit operations against collateral”.

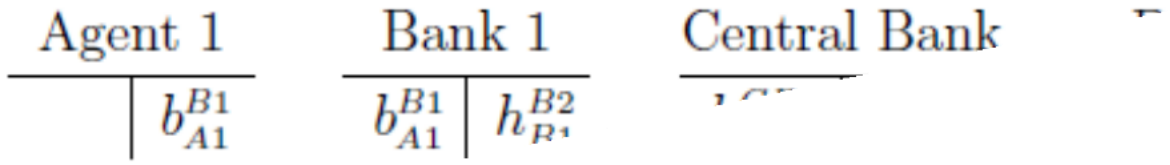
- With a reverse transaction, the central bank lends newly created reserves against eligible assets. The collateral remains in the bank’s balance sheet.

- The reverse transaction applies to regular and irregular refinancing operations, as the “targeted longer-term refinancing operations”, or TLTROs.

4.b.i. Reserves: emission: reverse transaction

- The initial stage of a reverse transaction is represented in Figure 11, where r_{CB}^{B1} is the amount of reserves borrowed by Bank 1 and h_{B1}^{CB} is the corresponding debt to the central bank, with b_{A1} used as collateral.

Figure 11: Reserves - reverse transaction - stage 1

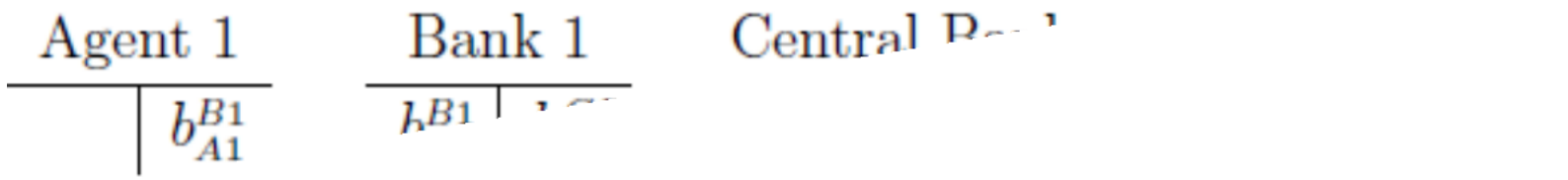


- The final stage requires that Bank 1 uses reserves to pay its debt h_{B1}^{CB} (plus the interest) to the central bank.

4.b.i. Reserves: emission: reverse transaction

- Now, suppose that Bank 1 in Figure 11 transfers r_{CB} to Bank 2 to settle its debt h_{B1}^{B2}. The result is in Figure 12.

Figure 12: Reserves - reverse transaction - deficit



- If a bank attracts more deposits than the amount issued through loans (Bank 2), then it has a surplus. If a bank loses deposits (Bank 1), it has a deficit.

4.b.i. Reserves: emission: reverse transaction

- When the transaction is reversed, the central bank receives the initial amount plus an interest.

- The interest is not created in the act of lending. Therefore, when the cost of money is positive, any standalone operation creates a financial deficit in terms on interest on reserves.

- The deficit can be overcame by the interest that the ECB pays on reserve accounts and deposit facility.

4.b.i. Reserves: emission: reverse transaction

- Since the 18th of September 2019 the interest rate on main refinancing operations (MROs) is 0%.
- Banks can keep reserves in a reserve account (minimum reserve requirement + excess reserves) and/or in the deposit facility.
- Required reserves (€0.15T) are remunerated at the MROs rate.
- Excess reserves (€2.9T) up to six times the minimum reserve requirements (€0.9T) are remunerated at 0%. Excess reserves above this threshold (€2T) are remunerated at the lower between 0% and the deposit facility rate.
- The deposit facility (€0.6T) is remunerate at -0.5%.

4.b.i. Reserves: emission: reverse transaction

- Technically, reserves from reverse transaction (RRT) are debt money for the banking sector.

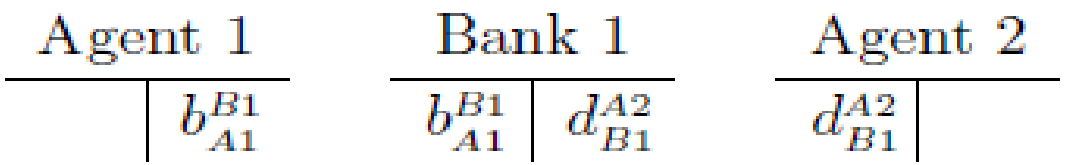
- However, banks do not usually default on their RRT because, as long as they have eligible assets to post as collateral, the operation is continuously rolled over.

- Hence, because RRT are rollover debt, they can be thought as equity money. In any case, however, RRT remains in the banking sector, and do not become equity money for the other sectors (households, firms, governments).

4.b.i. Reserves: emission: outright purchase

- An outright transaction is “a transaction whereby assets are bought or sold outright in the market (spot or forward)”.
- The most important examples of structural operations conducted through outright purchases are APP and PEPP.
- The central bank can buy assets from the monetary sector (banks) and non-monetary sectors (households, firms, governments, insurance company, funds, …).
- Let’s see the difference starting from Figure 2.

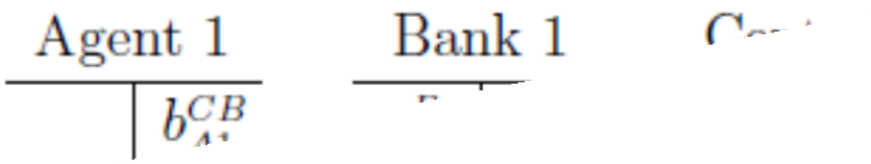
Figure 2: Circulation of bank money



4.b.i. Reserves: emission: outright purchase

- Suppose that, from Figure 2, the central bank purchases the asset b_{A1} from Bank 1 by way of newly created reserves.

Figure 16: Outright purchase



- The CB has changed the composition of the bank's balance sheet, with *potential* effect on the supply of commercial bank money.

4.b.i. Reserves: emission: outright purchase

- When we consolidate the private sector's balance sheet, as in Figure 17, reserves are backed by Agent 1's debt.

Figure 17: Outright purchase - private sector

Private Sector		Central Bank	
r_{CB}^{B1}	b_{A1}^{CB}	b_{A1}^{CB}	r_{CB}^{B1}

- The reserve disappears when Agent 1 reimburses the loan.
- Therefore, reserves created with outright purchases of financial assets (ROP) from a monetary institution are backed by a non-monetary sector's liability, and do not immediately create new liquidity.

4.b.i. Reserves: emission: outright purchase

- What happens when the CB buys an asset from the non-monetary sector? Suppose that Agent 2 buys a bond issued by Agent 3, as in Figure 18 (identical to Figure 4).

Figure 18: Outright purchase - non-monetary institution

Agent 1		Bank 1		Agent 2		Agent 3	
	b_{A1}^{B1}	b_{A1}^{B1}	d_{B1}^{A3}	b_{A3}^{A2}		d_{B1}^{A3}	b_{A3}^{A2}

- A QE operation means that the CB buys b_{A3}^{A2} from Agent 2 with newly created reserves, as in Figure 19. In this case, the CB passes through Bank1: the new deposit d_{B1}^{A2} of Agent 2 in Bank 1 is financed with newly created reserves r_{CB}^{B1}.

Figure 19: Outright purchase - non-monetary institution - central bank

Agent 1		Bank 1		Central Bank		Agent 2		Agent 3	
	b_{A1}^{B1}	b_{A1}^{B1}	d_{B1}^{A3}	b_{A3}^{CB}	r_{CB}^{B1}	d_{B1}^{A2}		d_{B1}^{A3}	b_{A3}^{A2}
		r_{CB}^{B1}	d_{B1}^{A2}						

4.b.i. Reserves: emission: outright purchase

- If we consolidate the private sector's balance sheet, we get Figure 17 with b_{A3} instead of b_{A1}.

- Again, ROP are backed by non-monetary sector's liabilities. Hence, they are debt money.

- However, when the asset is purchased from the non-monetary sector, ROP *increase* the supply of debt money, converting a promise of money (the bond b_{A3}) into money (the deposit d_{B1}^{A2}).

4.b.i. Reserves: summary

- Reserves created with reverse transaction (RRT) are, technically, debt money for the monetary sector. However, given the continuous rollover, each single bank might not perceive RRT as effective liabilities. Thus, RRT seem equity money for the monetary sector.
- Reserves created with outright purchases (ROP) are, technically, debt money for the non-monetary sector.
- ROP can become equity money if the CB commits to perpetually roll over the liability of a given agent in the non-monetary sector. The commitment in favour of government debt is called debt monetization, and it is equivalent to issue equity money.

4.b.ii. Banknotes

- Paul Sheard, Executive Vice President and Chief Economist of S&P Global: *"Repeat After Me: Banks Cannot And Do Not "Lend Out" Reserves"*

- "Reserves is where banknotes come from. […] Reserves go down when banknotes increase. Banknotes increase when borrowers take the money they borrowed out of the bank and part or all of the money remains in cash, rather than being re-deposited in the banking system".

- https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/programs/senior.fellows/2019-20%20fellows/BanksCannotLendOutReservesAug2013_%20(002).pdf

4.b.ii. Banknotes

- Banknote issuance is an entirely demand-driven process. A bank may wish to borrow banknotes because its depositors prefer to convert part of their deposits into cash.

- As the means of payments within the banking sector are electronic reserves, banks would not need to borrow banknotes without the demand by the public.

- Reserves, then banknotes.

- The nature of banknotes is the same of reserves where they come from. Hence, banknotes are non-debt money if they come from debt monetization.

4.b.iii. Coins

- While the member states of the eurozone cannot issue banknotes, in fact they have the power to mint coins. However, as detailed in Deutsche Bundesbank (2018), the power is mainly operational since the value of coins in circulation must be approved by the ECB.
- The value of coins is recorded as an irredeemable debt in the balance sheet of the fiscal authorities, and it is included in the Maastricht debt accounting.
- In 2017 the Italian government issued €23M of coins, sustaining a cost of € 23M. In the euro area the value of euro coins was € 0.03 T, 0.25% of the M2 and of the GDP, and 0.31% of the consolidated government debts.
- Coins are non-debt money buy cannot be used for economic policy because their face value is equal to the production cost.

4.c Government Debt and Tax Liability

- Fiscal authorities are part of the non-monetary sector. Therefore, they can finance expenditures with revenues (taxes) and/or debt, like households, firms, and financial institutions other than banks.

- Taxes are collected out of existing money, and they are a liability of the private sector.

- Government debt can be considered non-debt money for the private sector only if the CB rolls over in perpetuity the purchase of government debt.

4.d. Conclusion

- Technically, a government has been made like any other agent in the non-monetary sector (households, firms, non-banks financial institutions).
- Commercial bank money is debt money.
- For the non-monetary sector, central bank money is non-debt money if reserves are issued through asset purchases from the non-monetary sector, with the commitment to perpetually roll over the operation. Only in this way the issuer does not perceive their debt as effective.
- Banknotes have the same nature of reserves where they come from.
- Coins are non-debt money, but their purchasing power is equal to their production costs. Hence, no economic policy goals.

Food for thought

- Fiat money
- Digital money
- Central bank independence
- Fiscal vs Monetary Dominance
- Japan